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TO CORRESPONDENTS.

A. G. (Ludlow.)—*Well-purified coal gas should not discolour paper moistened with a saturated solution of the acetate of lead, or nitrate of silver; neither should it affect turmeric or litmus paper.*

J. S. (Glastonbury.)—*Dry lime.*

W. A. (Shoreditch.)—*Send a test of the gas to the directors of the Railway Company. They surely cannot be aware of the impurity of the atmosphere they compel their servants to breathe.*

"A London Gas Fitter's" *communication arrived too late for insertion.*

NOTICES.

Parties who receive the JOURNAL OF GAS LIGHTING *through Booksellers are requested to take notice that the Office for its publication is removed from* 21, *Paternoster-row, to* 88, *Cheapside.*

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25 ditto 6 ditto.
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The Editor will be particularly obliged by his friends forwarding to him Notices of all Meetings, Trials, or Appeals which it may be interesting to the Gas World to have reported.

Circular to Gas Companies.

WE announced in a portion of our last month's issue that Messrs. Peto and Betts, the contractors, who had undertaken the erection of the works of the Great Central Gas Consumers' Company, and had at the same time consented to take £50,000 in shares in the company, foresaw such difficulties in its execution, and entertained such doubts of its ultimate success, as to induce them to throw up their contract, and abandon their shares. It has, however, been since announced that other contractors have taken up the contract, but it is understood that they do not take up the shares, so that the *bond fide* subscriptions amount to only about £85,000, to meet engagements admitted to require £165,000, but which, we believe, will absorb at least £280,000, even had the parties been able to obtain permission to lay their principal mains along the streets and roads connecting their proposed work at Bow with the city of London, without contracting the engagement of lighting the whole of the intermediate districts on the same ruinous terms. Such, however, has not been the case, and they have elected to pay the penalty of expending another £50,000 in overrunning the suburban parish of Stepney and the scattered district of Whitechapel, without even the shadow of a chance, according to their own repeated admission, of its ever being remunerative. If indomitable perseverance under an accumulation of the most adverse circumstances deserved success, it has most assuredly been merited by the promoters of this company; but we appeal to all reasonable and unprejudiced men, and ask whether, in the face of the successive withdrawal from the project of nearly every respectable decoy whose name had been put prominently forward to entrap the unwary, the time has not arrived for the few who still remain to take the matter in hand, and fairly consider whether they are justified in continuing such an agitation with the slender chances which £85,000 afford of meeting an expenditure of £330,000? Indeed, if we may judge from the letter of a shareholder, inserted in another column, this feeling is entertained by some of the parties themselves; and the following letter, which has been addressed to one of the directors, whose character and standing have given respectability to the affair after so many desertions, places the matter in so clear a light, and coincides so completely with our own views, that we do not hesitate to give it a place:—

TO JOHN BRADBURY, ESQ.

London, April 8th, 1850.

SIR,—Without wishing in any way to disparage your colleagues in the direction of the Great Central Gas Company's committee, I feel that your withdrawal from the board would put a stop to that destruction of property already so serious, and which is still fast progressing in the wake of the agitation which is clothed with your sanction while you remain a member of the board.

Your object in joining the company doubtless was the same as many of those who first appeared among its supporters, and who, perhaps, more thoughtful of personal consequences, have retired.

The original trustees, Messrs. Hubert, Farquhar, and Nurse, where are they?

The second batch, Messrs. Currie, Dillon, and Black, where are they?

Who are the present trustees? Under your sanction the public believe Messrs. Dillon, Hooper, Rothschild, and Travers, to be trustees; but you know, or may know if you inquire, that they *are not* trustees.

You attended the deputation to Lord John Russell; you may not know that the trustees *refused* to sanction the same by their presence.

Who, then, are left as the supporters of this company if you retire? and can the company exist if you refuse the continued sanction of your name?

I ask you, seriously, are you prepared, by remaining, to continue and extend the injury now being inflicted upon many who have embarked their property in gas manufacture, not unwisely, for they had a right to believe their property would not be assailed by persons like yourself.

Why do you remain? What false sense of honour keeps you at the board? Personal advantage it cannot be? Indeed, I am aware your personal risk must be considerable, for some one must pay for the expenses now incurred, and you are not deluded by the idea of "limited responsibility."

For what purpose, then, are you still found supporting this crea-

ture of agitation? Without discussing the propriety or justice of the first agitation, the object held out to you has been obtained, the purpose for which you aided is secured, gas is supplied at 4s. per 1000 cubic feet. You do not desire more; why, then, are you with those who hold out prospects of even cheaper gas, which, if not delusive by intention, your own good sense cannot credit without further evidence than yet exists?

Do you feel pledged to the party? If so, for what was that pledge given? Was it not to obtain gas at 4s.? Or was it to produce a ruinous contest? Those who know you will not believe the latter. The former has been obtained. Your pledge is redeemed, and your connection cannot be longer demanded in fulfilment of your pledge. If you continue on the direction, you sanction something beyond gas at 4s. It is for you to define to yourself your ultimate object. Do not, I entreat you, remain, under your present sense of indefinite obligation, to support parties who have used you to effect a purpose which is now obtained; and your aid is still demanded by them for something further, to which you never did, and I am satisfied never will, pledge yourself, when you look at the objects as they are intended.

The companies supplying the entire of the eastern part of the metropolis have announced that, from Lady-day last, their price of gas is reduced to 5s. per 1000 cubic feet. This was to be expected; and there now only remains one company, manufacturing gas from Newcastle coal in the northern and western suburbs, which has not taken this step. The days of 6s. gas in the metropolis north of the Thames are, however, numbered.

The following report, addressed by a gentleman who has been prominently before the public, and was introduced as "the leading star in the present cheap-gas movement," to the Directors of a Gas Company in an important provincial town, groaning under the weight of a capital equal to £18 upon each ton of coal annually carbonized, will be read with interest by all, and tend to relieve the apprehensions of some who happen, unfortunately, to be similarly oppressed:—

"*London*, 48, *Moorgate-street*, *March* 11, 1850.

"GENTLEMEN,—I have received your letter of the 25th ultimo, and have to acknowledge the candour and consideration which suggested an application on such a subject to one who is supposed to be identified with somewhat extreme views in reference to the cheapness and quality of gas.

"The governing principle of all my estimates is this—that the cost of the production of gas bears a small relative proportion to that of its distribution and incidental charges; and that it may be much more remunerative to the seller to dispose of gas to 10,000 consumers within a small space, at 4s. per 1000 cubic feet, than to 100 over an equal area at 20s.

"Another principle which has been fully established by the experience of all gas companies is, that reduction in price invariably leads to greatly enlarged relative proportion of consumption; and that it is, therefore, for the interest of producers to stretch cheapness to the utmost verge of safety, seeing that the consequent enlargement of demand is not accompanied by anything like a similar ratio of expenditure.

"The enclosed sheet, No. 1,* is the estimate produced by me before the House of Commons as the basis of the calculation upon which the prospectus of the Great Central Gas Consumers' Company was founded. Sheet No. 2† is the estimate of No. 1 applied to the case of the —— Gas Light and Coke Company.

"From these it is obvious that, if you have to supply the public lights of —— at 4s. 8½d. per 1000 cubic feet, a charge of 9s. per 1000 for private lights, at the present amount of consumption, will not afford a higher dividend than 6¼ per cent., even on the assumption that the prices of coals, lime, &c., are not higher with you than they are in London.

"These results, however, do not deter me from recommending to you a progressive reduction in your charges; and without pointing out to you the injustice of saving the rates of those who are not consumers, by a low charge for public lights at the expense of a higher (nearly double) price to private consumers, it is certain that a reduction of 1s. per 1000 feet in the charge would induce an increase of demand to a far greater than to a merely equivalent extent; and that 15,000,000 cubic feet will pass through your mains with little or no greater expense for leakage, management, &c., than do the 9,000,000 now. Your dividends are likely to be greater as your rates become less, up to the point at which you shall have supplied the whole inhabitants of the city. What that reduction should be, your letter affords me no data to determine; but from the materials for judgment which you have afforded, and the knowledge I possess of your superior management and your mode of manufacturing, I feel perfect confidence that the gradual reduction I propose will result in benefit to your shareholders and advantage to your fellow-citizens.

"I have, &c., "A. ANGUS CROLL."

It has been said that figures may be so tortured as to prove anything, and there would appear to be some truth in the insinuation, when we find the same figures can be made to show that though gas at 4s. will in one locality pay 10 per cent. on capital judiciously expended, yet that 9s. will only yield 6½ per cent. in another, simply because one cubic foot is sold in the latter place to forty in the former. Three shillings and fourpence per 1000 feet may possibly be as fair an estimate of the cost of manufacture and distribution of the smaller quantity, as two shillings and one penny was for the larger; but how a capital equal to £4 per ton upon each ton of coal annually carbonized will suffice in one case, and £18 be required in the other, is an unexplained discrepancy, the cause of which is delicately concealed, but which cannot fail forcibly to strike every one who peruses this report. Had the same data been applied to the estimate No. 2 of the above which were used to prove that £165,000 would create and carry on an establishment annually manufacturing 368,000,000 feet of gas, and capable of distributing twice that quantity in the city of London, they would have shown that, instead of £18,000 being required for the present wants of the gas work of the town in question, £4500 ought to have sufficed—a capital which experience has demonstrated to be as ridiculously absurd in the one case, as the larger one of £165,000 has been predicted to prove in the city of London, notwithstanding the announcement that respectable parties have undertaken the work within the engineer's estimate. Contracts for £100,000 are not to be met with every day, but all such are of course based upon the performance of certain works, and not that those works shall fulfil certain obligations. That the works contracted for in this case shall be capable of performing what is promised of them is, we apprehend, as little proved, as is the practicability of the feat of the mountebank who summoned his credulous dupes to St. Paul's to witness his turning a somerset over its cross; or the possibility of the Eastern Counties Railway earning a 10 per cent. dividend upon the capital expended on it. Our views upon this subject are well known; and the above adds one more to the many other instances cited, that the lowest cost of any well-constructed gas work, new or old, large or small, has not been *less* than from £8 to £9 upon each ton of coal annually carbonized, and that those of the Great Central Company will largely exceed the estimate.

The metropolitan public will, we suspect, be more indebted to the London and North-Western Railway Company for any improvements which may take place in the general quality of the gas they consume, than to all the patented inventions of the last ten years. The spirited directors of that company have intimated their readiness to carry coal from the Lancashire cannel district to London, at the low rate of one halfpenny per ton per mile, provided a traffic to the extent of 45,000 tons per annum can be assured. At this rate of carriage the Wigan cannel, which is exclusively used in Liverpool and Manchester, and which yields a gas superior in the proportion of 22·5 to 12 above the standard adopted by the Great Central Gas Consumers' Company, might be delivered at the metropolitan gas works at from 19s. 6d. to 21s. per ton (according to their distance from the railway station, and the means of conveyance), should no augmentation in the present price at the pit take place, in consequence of the London market being thus opened to these collieries. We should be obliged if any of our correspondents would give us their opinion as to the effect which an additional demand to the extent of 100,000 tons a year would have upon the price at the pits, and also as to the capabilities of these mines permanently yielding this extra quantity. Should there be no objections to its adoption in London on these grounds, it is quite clear that a mixture of three quarters Newcastle coal, and one quarter cannel, will furnish a gas at a slightly increased cost, which at 5s. per 1000 feet will be equally as cheap as gas of the Great Central standard at 4s.; and, if anything can maintain a 6s. price in London, it is certainly the use of cannel coal in a greater proportion.

From the annual report of the inspector of the Metropolitan Fire Brigade it appears that the accidents having their origin in gas have amounted to 57 out of 838, the total number caused by fire which have happened within his jurisdiction during the year 1849. They are classed as follows:—

1 Escape of gas from street mains.
39 „ defective fittings.
3 Accidents in lighting.
9 Burning too high.
1 In a gas work.
4 Repairing fittings.—Total 57.

* Sheet No. 1 assumes the production of 368,000,000 cubic feet of gas from 40,000 tons of coals, at a cost of £38,950; which, after allowance for leakage, would realize, at 4s. per 1000 cubic feet, £61,333; affording a dividend of 10 per cent. on a capital of £165,500, with a surplus of upwards of £5000.

† Sheet No. 2 assumes the production of 9,393,000 cubic feet of gas, at a cost of £1572, from 1021 tons of coals, which, on the terms of the —— Gas Company, after an allowance for leakage, would realize £2831, affording a dividend of 6¼ per cent. on £18,000, with a surplus of £88.

The large number arising from defective fittings continues to be a reproach to the persons employed in that branch of the business, and suggests increased caution on the part of the inspectors appointed by gas companies. The report also draws attention, in the following terms, to another cause of accident which is fearfully on the increase :—

"I cannot help noticing the great number of accidents which are continually happening from the use of *turpentine* as a light-producing agent, in the garb of *naphtha lamps, camphine lamps*, or *portable gas lamps*. Many of these accidents have been attended with serious personal injuries, some of them ending in death. A more dangerous contrivance than these lamps (the latter especially) never entered a building."

From our parliamentary report it will be seen that the Government has introduced a bill to amend the Parochial Assessment Act, and to procure uniformity in its operation. We trust its provisions may be a less fruitful source of litigation than those of the statute which they are intended to amend. We shall return to the subject in our next, as the act is not yet printed, and we are consequently ignorant of the amendment proposed on the present law.

Communicated Articles.

THE HISTORY OF THE GAS METER.

(*Continued from page* 155.)

There is a fascination connected with scientific researches which few men of mechanical genius have power to resist. Prudential considerations may frequently obtrude themselves, in reflecting moments, to dissuade them from a career which, however delightful it may be, seldom leads to pecuniary advancement; but, even where a resolution is formed in accordance with this suggestion, circumstances generally arise to tempt them again into the enchanting vortex of invention.

The present chapter, which will be devoted to a review of several machines for the measurement of gas on principles different to those already described, will afford ample proof of the justice of this remark; for we shall find both Clegg and Malam, regardless of their former labours and their inefficient pecuniary reward, again foremost in the cause of improvement.

None of the plans now to be described have yet assumed a shape sufficiently practical to render them commercially useful; but they must not on this account be deemed altogether unworthy of our attention. For it is by investigating the errors and failures of men of known ability that we are directed in improving upon their ideas, and avoiding that which is chimerical in their schemes.

In the year 1820, John Malam obtained a patent for improvements in gas apparatus, included in which was a gas meter, a representation of which is given in fig. 15.

This meter is of that class which may be properly termed INFERENTIAL, inasmuch as by it the gas is not absolutely measured, but subjected to certain conditions during its transmission from which the quantity passed is inferred.

It is an ascertained law that the quantity of gas which passes through an orifice is in direct proportion to the area, if the pressure acting upon the gas is always alike. In this machine an arrangement is made to ensure a constant pressure upon gas flowing through an aperture, with a clock-movement so arranged and connected with it, that when the aperture is closed the clock ceases to move; but when the aperture is open the clock moves at such a rate as represents the area opened.

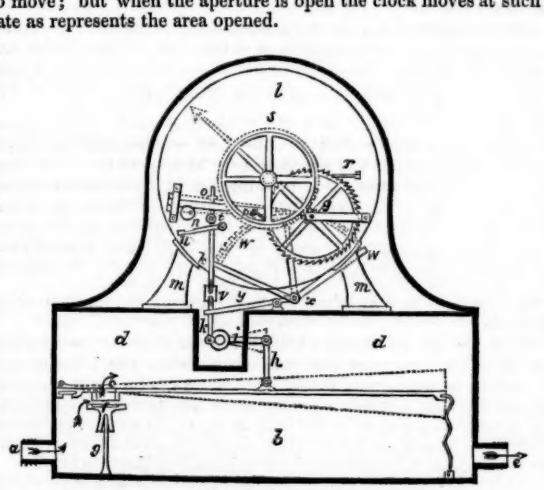

Fig. 15.—Section.

Fig. 15 exhibits a section of this meter; *a* is a pipe conducting from the gasholder, or from the street main, for the purpose of admitting the gas to be measured; *b* is a box or vessel, formed like bellows, with the upper flap rising and falling upon a joint or hinge; the sides, of course, are to be of a flexible material, as leather, cloth, &c., luted and secured at the edges, which is to be prepared with the essential oil obtained from coal tar, or with animal or vegetable oil mixed with coal tar, so as to render it airtight, and, at the same time, protect the texture of the material from being chemically acted upon or injured by the gas. From the box or vessel, *b*, the gas escapes through the aperture, *c*, into the outer case, *d*, *d*, and thence through the exit-pipe, *e*, to the burners. This aperture, *c*, is partially closed by the flat plate, *f*, suspended or swinging upon the rod, *g*, and accommodating itself to the descent of the flap.

The gas in the gasholder, being acted upon by a certain and uniform pressure, will pass in equal quantities, in equal spaces of time, through a given aperture. The width of the passage through the aperture, *c*, will be determined and regulated by the elevation of the flap, the weight of which is supported or balanced by the force of the gas; both the weight and the force being in general unchangeable, the width of the passage and, consequently, the quantity of gas which passes will be uniform. In order to register the quantity thus passed, a set of connecting rods or arms, one end of which is joined to the flap or lid of *b*, is carried up, as shown at *h*, *i*, *k*, for a purpose hereafter to be explained. The cylindrical box, *l*, supported and fixed upon legs, *m*, *m*, contains a clock-movement, or maintaining power, consisting of a spring in its barrel, with a band or chain acting upon a fusee, and a train of wheels, pinions, and a balance-wheel, as usual in timepieces. This clock-movement gives motion to an axle carrying the small eccentric wheel or a crank, *n*, for the purpose of raising the lever, *o*, which has its fulcrum on the axle of the wheel, *g*, and rests upon the periphery of the eccentric wheel. When the lever is thus raised, a small spring catch, *p*, attached to it, takes into the teeth of the wheel, *g*, and, when the lever again descends, the catch drives the wheel a short distance round. Another spring, *r*, holds the wheel as the lever again rises, and in this manner, by many revolutions of the eccentric wheel, *n*, raising and lowering the lever, *o*, the wheel, *g*, is driven entirely round. A pinion upon the axle of *g* takes into the wheel, *s*, which carries the hand or index round a graduated dial-plate not shown, and thus the quantity of gas which has passed through the aperture, *c*, under the certain pressure and circumstances before mentioned, becomes noted or registered by the dial.

If, however, the pressure of the gas should not be uniform, the flap of the box or vessel, *b*, will be raised or depressed accordingly, as shown by the dotted lines. In this event, the connecting rods or arms, *h*, *i*, *k*, will so act upon the lever, *o*, as to cause it to move through a greater or less arch, and hence to drive a greater or less number of teeth of the wheel, *q*, forward. Upon the arm, *k*, is a stop, *t*, which, when the flap of *b* descends and contracts the passage of the gas, will, by the connection of the arms, *h*, *i*, *k*, be raised so high as to prevent the lever from being acted upon by the eccentric wheel during a part of its revolution; consequently, under these circumstances, the arch described by the lever will be smaller, and the progress of the registering wheels less. But when the flap of the box, *b*, is raised, and the quantity of gas discharged greater, then the arm, *h*, will ascend, and the arm, *k*, descend, and the stud, *t*, be brought sufficiently low to enable the lever, *o*, to be acted upon by the periphery of the eccentric wheel during its entire revolution; by which the arch described by the lever will be greater, and the progress of the registering wheels greater also. The length of the rod or arm, *k*, may be altered and adjusted by a nut, *v*, having a right and left screw.

In order to stop the clock-movement when the supply of gas is stopped, a paul lever, *u*, is brought up by the rising of the rod, *k*, for the purpose of locking the eccentric wheel. To prevent the passage of the gas through the machine when the maintaining power is exhausted, and the movement requires winding up, the following contrivance is made use of:—Upon the axis of the fusee of the maintaining power is a pinion, which takes into a toothed arch or rack, shown by dots, *w*, *w*, as being on the reverse side of the cylinder, *l*. This rack, by the operation of winding up the movement, is carried back; but, as the movement goes down, the rack advances, by which a tooth, *x*, upon its axle, is made to press upon the short end of a lever, *y*, which is, by that means, raised, and made to lift the rod, *k*; at the same time causing the rod, *h*, to press down the flap of *b* sufficiently to bring the aperture, *c*, in contact with the flat plate, *f*, and hence to cut off completely the passage of the gas.

In the event of the leather or other flexible material which encloses the box or bellows, *b*, not being found fully to answer under every circumstance, it is proposed to form the box of metal, and to turn down the edges of the lid or flap into a groove filled with water, so as to enclose the gas by what is called a water joint, and allowing it to pass through the aperture, *c*, the top of the box or flap being connected by the rods to the clock-movement, as above described.

In the year 1835, John Malam also patented, among other apparatus, a *wet* meter, of a very ingenious description, which had the recommendation of being capable of measuring correctly at various water levels. There are two modifications of this machine described

in the specification of the patent; the one intended for not exceeding ten lights, and the other for upwards of that number. From the inventor's explanation few men even conversant with gas machinery would be enabled to form a clear apprehension of it. This does not arise from any defect in the description, but rather from the novelty and complex nature of the machine. It will be better, therefore, to premise a few observations before minutely describing its action.

The original wet meter has been shown to be essentially similar to a four-threaded Archimedean screw.

This meter is equally resolvable into four gasholders, each rising and falling—receiving and discharging gas in succession.

It will be clear to any one that four gasholders, or even three, filled and emptied in succession, would be capable of indicating the quantity of gas passed through them, and at the same time allow of a continuous supply of gas.

In the present machine, instead of using four distinct gasholders, one gasholder is divided into four by means of radiating partitions. A shaft is put vertically through the centre of its crown, the gasholder is immersed in water, and, instead of rising and falling as an ordinary gasholder does, it is made to rotate on its shaft, at an angle of about 30° out of a vertical position. These four gasholders, fixed round a centre and revolving in an inclined position, must each become enlarged and diminished in capacity during each revolution, and this enlargement or contraction of the chambers is the basis of a gas meter. It only remains, then, to show how the gas enters and departs from these chambers at the proper periods.

The following is a description of a meter on the construction proposed to be employed to register the consumption of gas for a small number of lights up to eight or ten: fig. 16 being a sectional elevation taken through the middle of the machine; and fig. 18 representing a plan of the same, the drum or cylinder of the meter being shown in a vertical position, that the passages for the gas may be more distinctly seen; and in fig. 17 the drum is shown inverted.

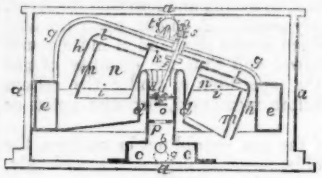

Fig. 16.—Section.

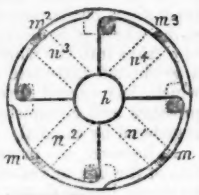

Fig. 17.
Plan of Drum reversed.

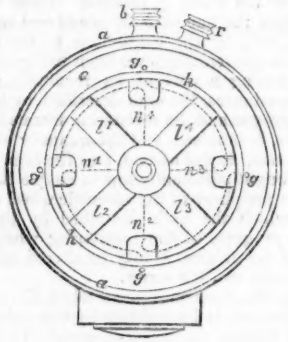

Fig. 18.—Plan.

a, *a*, *a*, represent the outer casing of the meter; *b*, the pipe for the ingress of the gas, connected with the chamber and upright central pipe, *c*, *c*. There is a tube, *d*, *d*, surrounding the upright pipe, *c*, which is supported by the annular float, *e*, *e*, *e*; and the pipe, *d*, *d*, is so constructed that it will support the footstep or bearing of the axis of the meter, which is seen within the upright pipe, *c*. It will be seen that the shaft or axis of the machine is supported at the top by the arms or frame, *g*, *g*, in connection also with the annular float, *e*, *e*: hence it will be evident that, as the float is always horizontal, the angle of the inclination of the axis of the meter will be invariable. The drum or cylinder of the meter is shown at *h*, *h*, *h*, and is mounted at the proper angle of inclination, which is shown in the drawing at about one-fourth of its diameter, and of course may be varied at pleasure. It will be seen in the sectional elevation, fig. 16, that the height of the water which is represented at *i*, *i*, must meet the lowest point of the inner circumference of the top of the cylinder, *h*, *h*; and the lowest point of the bottom edge opposite will dip into the water sufficiently to seal the gas and prevent its escape, except through the proper passages, from one division of the cylinder to the other. The different compartments of the cylinder, with their passages, will be more clearly seen by reference to figs. 17 and 18.

The gas proceeding through the fixed pipe, *c*, into the central chamber, *k*, of the cylinder, from whence it passes in radial directions to the circumference, through the four passages, *l*, *l*, *l*, *l*, on the top of the cylinder, into the segmental passages, *m*, *m*, *m*, *m*, next the outer circumference of the cylinder, which are so divided that the gas passes into the four inner compartments, *n*, *n*, *n*, *n* (see fig. 18, which is shown inverted), ascending on the one side, and is discharged as it descends on the opposite side. The passages for the ingress and egress of the gas, and the four compartments through which it passes to be measured, are marked with corresponding figures; that is to say, that as the gas proceeds from the central chamber, *k*, through l^1, on the top of the cylinder, it thence passes through the circular divided passage, m^1, to the compartment, n^1, in the cylinder, and so on, and is discharged at the circular orifice opposite to the point to which it is received, and which is further shown by the direction of the arrows. In case the water should decrease, by evaporation or otherwise, it will be seen the float and meter will descend with the surface of the water until its progress is arrested by the valve, *o*, suspended from the step of the shaft, *f*, in the pipe, *c*, falling upon its seat, *p*, which will entirely exclude the admission of the gas until a further supply of water is given. At the bottom of the chamber, *c*, in the opposite direction to the entrance of the gas at *b*, is connected a pipe, for the purpose of drawing off the condensation or other liquid which may accidentally be deposited in the central chamber, *c*, *c*. After the gas has been measured as above explained, it rises from the water into the case, *a*, *a*, from whence it passes off through the branch pipe to the burners. The mode proposed to register the gas as it proceeds through the meter is as follows:—To the axis of the cylinder is affixed a worm, *s*, which actuates a wheel, affixed upon the arms or frame, *g*, *g*, of the float. To the shaft of the wheel is affixed a rod, having an universal joint at each end, which accommodates the wheel, to the ascent or descent of the meter. To the other extremity of the rod, is a small axis passing through a stuffing-box, and carrying the pinion, which actuates two count-wheels; the back wheel being mounted upon a fixed centre, and the front wheel being fixed upon the boss of the hinder wheel which carries the index or hand, and thus registers the consumption of the gas, which will be marked upon the front wheel carrying the dial. Supposing the worm to have a single thread taking into the worm-wheel, of fifty teeth, affixed to the shaft, carrying the pinion, which has five teeth working into the two wheels; the one having 246 teeth, and the other 247 teeth; it is evident that 610,000 revolutions of the meter cylinder being accomplished before two wheels have effected an entire change, will thus register 10,000 cubic feet of gas.

The meter for more than ten lights differs from the one described only in this particular, that, instead of the gasholder being made to rotate upon a shaft in an inclined position, it is made to incline to every part of its circumference in succession by means of an eccentric motion at the top. The latter is undoubtedly the preferable plan, for by it each compartment is simply made to rise from, and dip into, the water; while by the other the water is carried round by the partitions, involving a greater amount of friction and a gyratory motion of the water.

The next meter to be described is the invention of the indefatigable Clegg, who, besides the attention he has devoted to other branches of engineering, through a long and laborious life, has spent much time and evinced surpassing ingenuity in this the most elegant and philosophical of all his inventions.

Before describing the apparatus itself, it will be necessary to premise a few words in explanation upon the pulse glass,—an instrument not generally understood, and upon which the action of this meter depends.

The pulse glass is a glass tube bent into a semicircle, as represented (*a*) fig. 19, having a bulb at either end. These bulbs are each sealed up while half filled with alcohol; the external air being expelled from the remaining portion, and its place supplied by vapour of alcohol.

If this glass be placed with the tube downwards, and the two bulbs horizontal with each other, the fluid will assume the same level in each; but, if the slightest heat be applied to one of the bulbs, a portion of vapour will be formed in it, the expansive force of which will press upon the fluid and discharge it into the other bulb. If the heat be then applied to the opposite bulb, the same result will take place, and the whole of the fluid be again pressed into the coldest bulb, from the greater expansive force due to vapour a few degrees warmer in the one bulb than in the other.

The machine is described by the inventor in the following terms:—

"B B, fig. 19, represents a cylindrical vessel, about three inches and three-quarters diameter, and four inches deep, being the dimensions of a meter capable of measuring gas for three burners, called a three-light meter. In this vessel are two glass cylinders, F F, connected together by the bent tube, *d*. The cylinders being perfectly exhausted of air, and half filled with alcohol, are made to vibrate on centres, *e* and *e*, and are balanced by the weight, *f*.

"This instrument accurately indicates the excess of heat to which either cylinder may be exposed, upon the principle of Leslie's differential thermometer.

"C is a hollow brass box, called the heater, about four inches long and half an inch broad, projecting out of the meter about one

inch. At *a* issues a small jet of gas, which when inflamed gives motion to the cylinders.

"The gas enters the meter by the pipe, A, and circulates through-

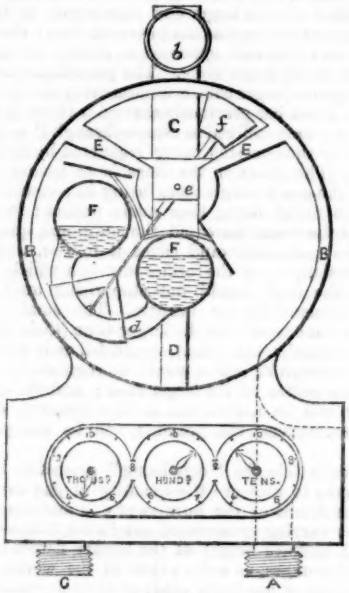

Fig. 19.

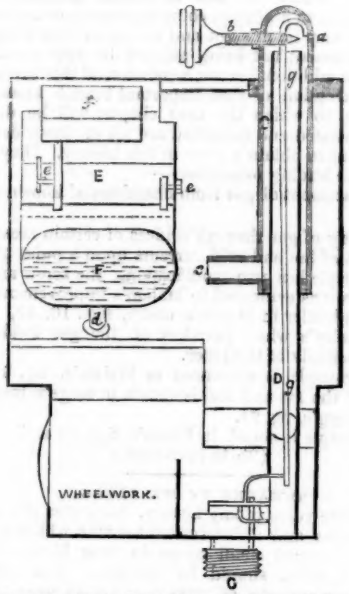

Fig. 20.—Three-light Meter, half the full size.

out the double case, B; having passed round the case, B, a portion of it enters the top of the box, C, by the pipe, D, and passes out again at the bottom by the tube, *c*, into the meter; the rest of the gas enters the body of the meter through holes in the curved faces of the hoods, E E, and after blowing on the glass cylinders passes to the burners by the outlet pipe.

"To put the meter in action, let the jet, *a*, be lighted about an hour before the burners are wanted. In most cases this jet will be lighted all day as a useful flame. The hole, *a*, is so situated on the box, C, that, whatever be the size of the jet, a fixed temperature is given to the box, that temperature depending on the quantity of flame in contact with the box, and not at all on the length of the jet. The jet being lighted, and the box, C, thereby heated, the gas which passes through it is raised to the same temperature, and flowing out at the tube, *c*, impinges on the glass cylinder which happens for the time to be the lowest; the heated gas soon raises a vapour in the lower cylinder, the expansion of which drives the liquid into the upper one, until it becomes heavier than the counterpoise, *f*, when the cylinders swing on their centre, the higher one descends and comes in the line of the current of hot gas, and the lower one ascends; the same motion continues as long as the jet, *a*, burns. The same effect on the cylinders is maintained, however the outward temperature may change by the cold gas, which, issuing from the curved side of the hood, E E, impinges on the upper cylinder, and hastens the condensation of the vapour which it contains.

"The cold gas and the heater vary in temperature with the room, and thus counteract each other.

"The lighting of the jet, *a*, is essential to the action of the meters; in order to ensure this, the supply of gas to the burners is made to depend on it in the following manner:—The pipe, G, by which the gas leaves the meter, is covered by a slide valve which is opened and shut by the action of the pyrometer, *g*; the pyrometer is in communication with, and receives heat from, the jet, and opens the valve when hot, closing it again when cold.

"The speed at which the cylinders vibrate is an index of the quantity of heat communicated to them, and is in exact proportion to the quantity of gas blowing on them through the pipe, *c*, and curved side of the hoods, E E.

"The gas passed through the heater is a fixed proportion of the whole gas passing the meter; therefore the number of vibrations of the cylinders is in proportion to the gas consumed.

"A train of wheel-work, with dials, similar to that used in the common meter, registers the vibrations.

"Simplicity, accuracy, and compactness are the most remarkable features of this instrument; and the absence of all corrosive agents will ensure its durability."

This meter, it is clear, is purely inferential in its measurement. Yet to such perfection has it been brought, that one, which was subjected to severe trials—burning one jet occasionally, and at other times the full quantity of lights which it would supply—did not vary in its registration five per cent. from the truly measured quantity: a result which must appear astonishing to any one conversant with the difficulties to be surmounted in so delicate an adjustment. The inventor assigns as the reason for having abandoned them at present, "the time and care required to adjust them in manufacturing them for general use;" but to this admission he has added the hope which, after so much fruitless labour, could only emanate from an inventor, "that some day perhaps this may be obviated."

The next instrument to be described is a meter intended to measure the gas supplied to the consumers from a station where great accuracy is not so important as an approximate *estimate* of the quantity; this occurs in a patent taken out in the year 1842, by Mr. Edge.

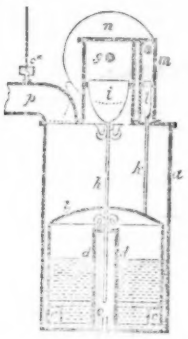

Fig. 21.

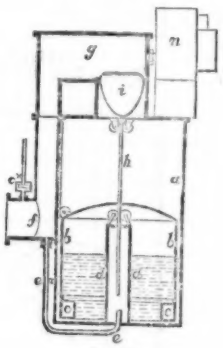

Fig. 22.

Figs. 21 and 22 represent modifications of station gas meters, in which the quantity of gas passed through them is ascertained by the measurement of a fractional part of the volume of gas only, and whereby the whole quantity may be inferred. Figs. 21 and 22 are sections of a station gas meter, taken vertically at right angles to each other. *a*, *a*, is a cylindrical tank, containing water; *b*, *b*, is a gasholder, working within, having an air-chamber, *c*, *c*, at its bottom, to give the gasholder buoyancy. A central tube, *d*, has a small pipe, *e*, in its bottom, communicating with the inlet gas pipe, *f*, and its chamber, *g*. A vertical rod, *h*, *h*, attached to the gasholder, passes between guide pulleys, carrying a parabolic cone, *i*, at its upper end, which cone, as a valve, fits into the seat or aperture communicating between the chamber, *g*, and the upper part of the tank, *a*, *a*. Another vertical rod, *k*, attached to the gasholder (shown at fig. 21), carries a smaller parabolic cone, *l*, at its upper end, which acts as a valve in an auxiliary chamber, *m*, placed by the side of the chamber, *g*. An ordinary gas meter, *n*, of small dimensions, is placed at the upper part of the apparatus, having an inlet-tube from the chamber, *g*, for conducting a small quantity of gas into this little meter; from which, when measured, it is discharged through an aperture into the auxiliary chamber, *m*. The gasholder, *b*, *b*, is weighted equal to about two-tenths of a column of water, and, therefore, when the pressure is the same, both above and below the gasholder, it will bring down the cones, *i* and *l*, and close the communications. If, then, the pressure of the gas in the tank, *a*, *a*, be diminished, by the required discharge through the pipe, *p*, to the main and burners, the passage of the small quantity of gas admitted

through the pipe, *e*, to the interior of the holder, *b*, will cause the holder to rise, and thereby open the valves, *i* and *l*, and allow the equivalent quantity of gas to pass through them to the tank, *a*, *a*. As the cone-valves, *i* and *l*, bear a certain relation to each other in all their parts (the former being so many times larger than the latter), the passage of the gas through the small meter, *n*, from the chamber, *g*, to the chamber, *m*, and thence to the tank, will always measure a proportional quantity of gas, and thereby indicate, by inference, the whole quantity passed through the valve, *i*.

Mr. Clegg has in a later instrument, which is shown in figs. 23 and 24, applied, probably without knowing of its previous existence, the principle used in the preceding one, with great accuracy, to consumers' meters.

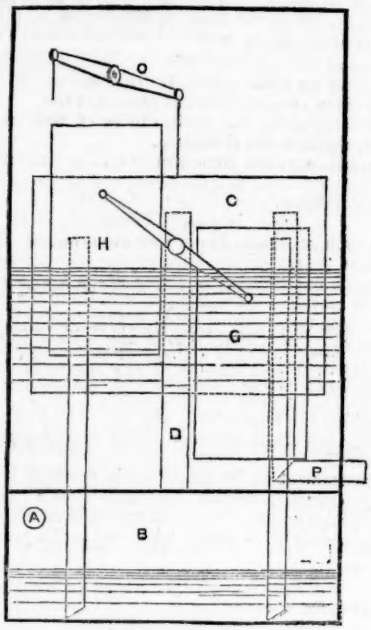

Fig. 23.—Section.
Twenty-light Meter, quarter the full size.

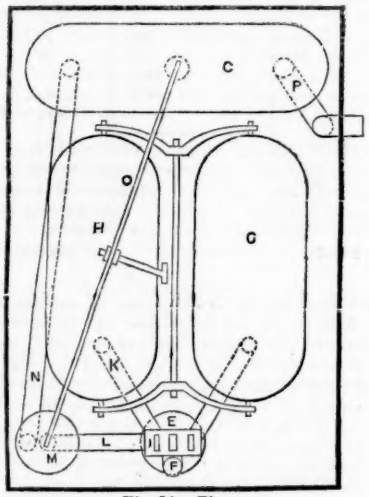

Fig. 24.—Plan.
Twenty-light Meter, quarter the full size.

The gas enters the meter at A, and, being received into the air-tight chamber, B, is divided into two portions: one portion passing into the governor, C, through the pipe, D; the other into the vessel, E, through the pipe, F, to which vessel there is attached a slide valve, which alternately allows the gas to flow into G and H, two gasometers, open at the bottom, which rise and fall with action similar to a common gasholder. They work upon the same centre, and communicate motion to the slide valve, I: thus, when the gasometer, H, is at the top stroke, the slide valve is thrown over the opening communicating with it and the centre opening, and thus permits the gas with which it is full to flow away through its pipe, K, down the centre opening, and by the pipe, L, into the vessel, M, containing a small cone. While this can is emptying, the other can, G, is filling, and when it is full the slide valve is reversed, and the same action takes place as when H was full. The measured gas from each gasometer alternately passes through the pipe, N, into the governor, C. In this governor is a cone of larger dimensions than the cone in the vessel, M, which large cone regulates the discharge of gas into the governor from the pipe, D. Both cones are suspended, one at each end of the lever, O. The large cone is suspended with its larger end *downwards*, so that it closes the orifice in which it hangs as the governor rises; the small cone is hung with the larger end *upwards*, so that its action is synonymous with that of the larger cone. The gas which passes into the governor through the larger cone is unmeasured, and unites with the measured gas, which has previously entered it through the pipe, N. This united gas is then suffered to escape through P to the burners, the total quantity thus passing being registered by an index in the usual manner. The object of the cones is to ensure the relative discharges of the gas through them being in a constant ratio, the accuracy of the meter being thus made perfect: for instance, if the pressure in the mains increased the additional quantity of gas flowing into the governor would cause it to rise, and, rising, the cone would partially close the orifice through which the gas was passing, and the cone would not stop rising until the supply equalled the demand by the burners. The small cone, being attached to the same lever with the larger cone (their strokes being equal and their lengths the same), would fall as it was rising, and the discharge through its orifice would be regulated precisely with that through the orifice of the larger cone; and the discharges of both together will be maintained at that quantity due to their respective areas, because the pressure will be always the same in both.

Mr. Clegg calls this the "equalizing" gasmeter, because it is intended not only to measure the quantity of gas consumed, but to maintain the flames of the burners at one uniform height, irrespective of any varying pressure of gas in the mains—the perfect steadiness and uniform height of the burner flames being one of its proposed advantages, as well as that all the working parts exposed to the action of gas being made of glass or earthenware, and the pipes of pure tin, great durability is ensured, and all leakage prevented. Its small size and handsome appearance make it suitable for a place in a library, counting-house, or any other spot, where its index may be in sight and the water kept from freezing; and the measurement not being affected by any variation of the water level is an additional recommendation of this invention.

With the exception of that important branch known as Diaphragm Meters, to which the next chapter will be devoted, the machines enumerated and described are all of those deemed sufficiently important to obtain a place in this history. They may all be referred to three leading principles:—

1. The displacement of gas from chambers of known dimensions by water.
2. The passing of gas through orifices of certain areas.
3. The effect of hot and cold currents upon a pulse glass.

The 1st principle has two modifications, the screw and the gas holder; the screw as evidenced in Malam's improvement on Clegg, fig. 4; the gas holder in Malam's meter, figs. 16, 17, 18. What is termed Crosley's wheel partakes of the gas holder and the screw, but principally of the latter.

The 2nd principle is evidenced in Malam's, fig. 15; while a combination of the 1st and 2nd is shown in Edge's meter, figs. 21 and 22, and Clegg's, fig. 24.

The 3rd principle is shown in Clegg's, figs. 19 and 20.

(*To be continued.*) X. Z.

REMARKS BY MR. CLEGG.

Sir,—The true value of any history, no matter of what subject, is the correctness and disinterestedness with which it is written; and I observe several small errors in your history of the Gas Meter which I think should be rectified. You will, perhaps, imagine that any remarks of mine may not possess that quality I have above stated as being one of the essentials to the value of history, viz., disinterestedness; but, I assure you, I am perfectly impartial, and desire that every one connected with the invention and the improvement should have his due share of credit. Will you, therefore, give the following a place in your Journal, which I have too much respect for, and desire its advancement too sincerely, to see in its pages anything but facts?

The communication between the divisions of the meter drum of 1816, as represented generally in fig. 3, was effected by means of hydraulic valves, and not by spring-tail valves; these latter were *tried*, but they were never used in practice; indeed they were merely experimental valves, abandoned because they would not work; consequently *the* meter of 1816 should not be represented with them.

Mr. Malam was my foreman for the erection of some of the Chartered Gas Company's works, viz., from 1815 to 1818; and, during that period, had also the superintendence of the gas meter manufactory; and I do no more than justice when I say that Mr. Malam's introduction of the bent inlet pipe was a very valuable and important improvement, and did much towards the successful introduction of the machine. The great object in dividing the drum of the meter was, and is, to enable the outlet and inlet hoods to pass through equal spaces in equal times; the divisions of Malam's meter, as drawn in fig. 4, would not allow

of this; and it would not work without causing the burner flames to jump prodigiously. I merely refer to your figure because I never saw any other drawing of it.

The divisions of my meter drum, which I proposed for commercial use, terminated at an inside rim, concentric with the outer one, and of larger diameter than the water circle; and this inner rim was the boundary of the measure, which was not, therefore, influenced by any variation in the water line; and upon this plan I made all my station meters. But this form of drum was expensive; and, after various contrivances by myself and Mr. Crosley, jointly and in company, to make a cheaper instrument, the drum as now constituted was devised.

The concentric-rim drum, although it was a truer measure, caused the lights to fall and rise slightly each time that a hood left the water; and a governor had to be interposed. The drum, as now constituted, does not, as you correctly state, require the interposition of a governor; but, in removing one fault, another took its place: for the measure varies with every change in the height of the water line.

You suggest that the invention of the governor arose from the defects existing in the original meter; but this is wrong, since the governor was included in the specification of the meter patent; and, if I had considered it a necessary appendage to the meter, I should have so specified. I considered them as two distinct machines, invented simultaneously for two distinct purposes—one for regulating the initial pressure of the gas as it passed into the mains from the gasholders; the other for measuring the quantity supplied to the consumers.

The patent right never fell into Mr. Crosley's hands exclusively: we were both interested in it, and worked together from almost the commencement until the term for which the patent was granted expired. Neither the Archimedian screw, the clepsydra, nor the experimental gasholder furnished one idea towards the invention of the meter; and you will be good enough to pardon me for saying that you are in error in supposing their action to be analogous.

S. Clegg.

London, March 25, 1850.

Correspondence.

CLAY AND IRON RETORTS.

Sir,—I can scarcely wonder that the Scotch gas engineers should feel surprised at the contradictory statements advanced by your numerous correspondents upon the merits or demerits of iron *versus* clay retorts. In some instances the advocates for the superiority of clay over iron have as much overrated the capabilities of the clay retort as the theoretical opinions advanced in the letters of "Aluminium Ferrum" have underrated them in comparison with iron.

It is generally known that clay retorts are more extensively used in Scotland than in England; and it certainly appears to me that, whilst some gas engineers in England have been amusing themselves with fine-drawn deductions as to the merits of clay retorts, the gas engineers in Scotland have wisely given them an unprejudiced trial, and by the general introduction of them have practically proved that they are superior in cheapness to iron ones in the production of coal gas.

As the time has now arrived when every gas company will be compelled by opposition from without to adopt the most inexpensive apparatus for the production of gas, it behoves the gas engineer to fling to the winds all nicely-balanced theories, founded mostly upon opinions and analogy, and prove for himself, by a fair unprejudiced trial, whether clay retorts be cheaper or dearer than iron ones.

With these few remarks I shall proceed at once to give you a faithful copy of the practical results, during four years, of the cost price per 1000 cubic feet of gas from iron retorts *only* for two years, and also the results from clay retorts *only* for two years, upon an establishment where at present 50,000,000 cubic feet of gas are produced annually.

Iron Retorts, D Shape.

From Jan. 1, 1846, *to Jan.* 1, 1847.

	s.	d.
Net cost of 1000 cubic feet of gas, exclusive of dividends, depreciation, and bad debts	2	10·392
Cost of iron retorts, per 1000 cubic feet	0	2·52
Cost of 1000 cubic feet of gas, exclusive of retorts ..	2	7·872

Coke.

	s.	d.
At 8s. 4d. and 6s. 8d. per ton, the price received per 1000 cubic feet of gas produced was	0	2·5

The average production of gas per ton of coal and cannel was 9380 cubic feet.

Iron Retorts, D Shape.

From Jan. 1, 1847, *to Jan.* 1, 1848.

	s.	d.
Net cost of 1000 cubic feet of gas, exclusive of dividends, depreciation, and bad debts	2	8·736
Cost of iron retorts, per 1000 cubic feet	0	2·772
Cost of 1000 cubic feet of gas, exclusive of retorts ..	2	5·964

Coke.

	s.	d.
At 6s. 8d. per ton, the price received per 1000 cubic feet was	0	2·674

The average production of gas per ton of coal and cannel was 9500 cubic feet.

Clay Retorts, D Shape.

From Jan. 1, 1848, *to Jan.* 1, 1849.

	s.	d.
Net cost of 1000 cubic feet of gas, exclusive of dividends, depreciation, and bad debts	2	4·656
Cost of clay retorts, per 1000 cubic feet	0	1·236
Cost of 1000 cubic feet of gas, exclusive of retorts ..	2	3·42

Coke.

	s.	d.
At 6s. 8d., 5s. 10d., 5s., and 4s. 2d. per ton, the price received per 1000 cubic feet of gas produced was ..	0	2·8

The average production of gas per ton of coal and cannel was 11,326 cubic feet.

Clay Retorts, D Shape.

From Jan. 1, 1849, *to Jan.* 1, 1850.

	s.	d.
Net cost of 1000 cubic feet of gas, exclusive of dividends, depreciation, and bad debts	2	3.72
Cost of clay retorts, per 1000 cubic feet	0	1·1976
Cost of 1000 cubic feet of gas, exclusive of retorts ..	2	2·5224

Coke.

	s.	d.
At 5s. per ton, the price received per 1000 cubic feet of gas produced was	0	2·917

The average production of gas per ton of coal and cannel was 11,210 cubic feet.

Perhaps the above data will cause the most inveterate opponent to clay retorts to pause before he finally consigns them to oblivion; at least, I trust it will be the means of causing the undecided gas engineer to give them a trial; for what can be done at one gas works may, with proper management, be accomplished at any other.

I will not, at present, trespass further upon your space than to state the average saving effected per annum at this gas establishment, by the adoption of clay retorts in lieu of iron, in the years 1848 and 1849, in comparison with iron retorts, which only were used in the years 1846 and 1847; taking the production in each of the four years to be 50,000,000 cubic feet.

	s.	d.
The average net cost of gas with iron retorts, used during the years 1846 and 1847	2	9·564
The average net cost of gas with clay retorts, used during the years 1848 and 1849	2	4·188
Difference in favour of clay retorts per 1000 cubic feet	0	5·376

50,000,000 cubic feet multiplied by 5·376d., the saving per 1000 cubic feet effected by the adoption of clay retorts, in lieu of iron, is £1120.

In conclusion, I must state that I have other interesting data, which I am afraid will not at all agree with the opinions expressed in the letters of "Aluminium Ferrum"; but which, with your permission, I will furnish you with in time for your next number.

——, *Lancashire, March* 14. Experimentum Crucis.

THE "CHEAP GAS" AGITATION.

Sir,—I assume that your columns are open to the shareholders of all gas companies, and, as such, I venture to urge upon you the present position of the shareholders in a gas company not long established, called "The Great Central Gas Consumers' Company."

As the name imports, the greater part of us are consumers of gas within the City. We thought the price of gas too high; at least, being told so, we were willing to believe it; and, at all events, the result has proved beneficial to us, for we now have our gas at 4s. instead of 6s. per 1000 cubic feet. I do not think I am unreasonable if I now declare myself satisfied, and, though I am quite willing to sacrifice the calls I have paid upon my shares in the Great Central Gas Company, yet I am not as ready to go on paying further calls upon my shares, as I have, in truth, got all I wanted, namely, gas at 4s.; and, considering the amount of gas I consume, I may not, perhaps, have made a very wise speculation, for I find the gas I consume will not afford much margin for the payment of calls.

My difficulty is this, and I call your attention to it; and trust you will not refuse to allow yourself to be the medium of having the question solved. As this company state that 6000 persons have entered into contracts with them for gas, I assume that as many have become shareholders. Now, how to get the opinion of this large body—the shares are not saleable apparently, and I fear, if I did sell, a shareholder is still liable, having signed the deed. Is it too much to ask you to receive the opinions of the shareholders at your office on the subject? If many of them are satisfied with 4s. gas, and wish to have the company wound up, I would then call a public meeting to consider the propriety of so doing.

I am, Sir, your obedient servant,

A Shareholder in the Great Central Gas

London, April 4. Consumers' Company.

[The respectable source from whence we receive the above induces us to say we shall be happy to receive the opinions of the shareholders, if they desire it.]

WATER GAS.

Sir,—In your Journal of the 10th of October last you made some severe strictures on my patent hydro-carbon gas and apparatus, which, although I felt at the time to be unjust, I have delayed replying to, until I found myself in a position to prove their inaccuracy. I am now able to do so, and have, therefore, to beg of you, as an act of justice, to insert in your Journal the following particulars respecting the progress I have made.

You state that, in the experiments upon which your report is founded, the cost of fuel alone for its production nearly equalled the whole cost of coal and fuel for the manufacture of coal gas. This is only one gross misrepresentation among many of your report, as the actual cost of material and fuel for 10,000 cubic feet of my gas is only 2s. 9½d., as follows, viz. :—

	s.	d.
24 gallons of water	*nil.*	
6 cwt. resin, at 3s.	18	0
1¼ bushel charcoal, at 4d.	0	5
28 lb. scrap iron, at 2s. 6d.	0	7½
¼ ton fuel for furnace, at 10s.* ..	2	6
	21	6½.

Deduct from this the residual products (resin, oil, naphtha, &c.) from the above quantity of resin, as follows :—

	s.	d.
24 gallons resin oil, at 5d.	10	0
4 gallons naphtha, at 2s. 3d.	9	0
30 lb. oxide of iron	1	0
	20	0
Less expense of distillation ..	1	3
	18	9

Which amount, deducted from 21s. 6½d., gives 2s. 9½d. as the cost of 10,000 feet, or rather less than 3½d. per thousand cubic feet, *exclusive* of wear and tear, labour, repairs of works, interest on capital, &c.

As regards the comparative commercial value of the gas in point of light, I would state that its specific gravity is, on the average, ·924; while by the chlorine test it shows 12½ per cent. of olifiant gas, and has an illuminating power 26.5 per cent. superior to the Manchester cannel gas, 20.5 per cent. to the Salford cannel gas, and 42.25 per cent. to the Chester coal gas.

With regard to the cost of labour, &c., it may appear somewhat extraordinary that these items are below what is usually experienced; and this arises from the great rapidity of production accomplished by my arrangement (which is three times the ordinary speed, as compared to that of carbonizing coals); considerable less wear and tear of retorts and their appendages consequently follow, the heat I use being much below that usually employed, and there being little carbonaceous deposit, arising from the peculiar mode of arrangement and admission of the hydrogen and oxide of carbon, I am enabled to carry on the process for a period of twelve to fourteen hours without once relieving the retorts—a fact accomplished which has been a serious stumbling-block to others.

As regards the utilizing of coal tar you speak of, and wherein you name the various difficulties which have presented themselves to others in manipulating with this material, I can safely say I have never rejected the use of this bituminous substance; I can now use it up with the same ease and rapidity as common resin, and produce from every twelve gallons 2800 cubic feet of gas, equal in illuminating power to the best-made cannel gas, or 3500 cubic feet of superior quality as compared to that from Newcastle coals. I was quite aware of the many and obstinate difficulties I should have to contend with, not one of which now exists with me; as a proof of which I shall be happy to be of service to any gasmaker who should feel disposed to use up this most valuable of all bituminous products.

The truth of these facts may be ascertained by any party taking an interest in my invention, paying a visit to the Southport Gas Works, or the extensive works of Messrs. Schwabe and Co., Rhodes, near Manchester.

I have no wish to disturb the good understanding now existing between the consumer and vender of gas; on the contrary, my wish is to be of service to the gas manufacturer, and, consequently, to the public, thus benefiting both parties.

Manchester, March 28, 1850. Stephen White.

[Mr. White must excuse us if we have omitted from his somewhat tardy reply to the observations upon his process, which appeared in our October number, such portion as seemed to us more suited to an advertisement, than is consistent with a simple explanation. We have, however, retained all the *facts* he quotes bearing upon the question at issue between us; but they in no manner change our opinion of the impossibility of an economical adoption of his scheme, and of its inferiority to many of its predecessors. The experiments upon which that opinion was in some measure founded were fairly and truly given by us, and admit of no contradiction. The apparatus was constructed by himself, and erected under his superintendence; he was present during the greater portion of the time that the experiments were in progress, and was invited to remain during the whole time, so that any imputation upon their authenticity and correctness, "because they differ from his experience elsewhere," must now be received with suspicion. Our readers will bear in mind that they proved the relative cost of materials and fuel for each 1000 feet of gas, of a standard illuminating power, to have been :—

	s.	d.
From Newcastle coal on the ordinary plan ..	0	10·5
,, Resin, by Daniel's apparatus	2	2·5
,, Resin and water by White's apparatus ..	2	10·2

and Mr. White now attempts to prove that the cost elsewhere has been only .. .. 0 3·5

a difference so enormous as almost to baffle investigation. It, however, often happens that blind partisans, in attempting to prove their case, prove too much; and Mr. White, unfortunately for himself, has fallen into this trap, as, in attempting to show the great advantages of his process, he would make us believe that he gets more *out of his retorts than is put in*. He states that to produce 10,000 feet of gas of a specific gravity of ·924 he uses

	lbs.
24 gallons of water	240
6 cwt. of resin	672
Scrap iron	28
Total .. .	940

from which his products are—

	lbs.
10,000 cubic feet of gas, specific gravity ·924	693
24 gallons resin oil	216
4 gallons naphtha	34
Oxide of iron	30
Total	973

showing an excess of 33 lb. of products over the materials employed, in addition to the carbonaceous deposit in the retorts, which he acknowledges to be sufficient to choke them up in twelve or fourteen hours, and which one of our informants who lately visited the Southport Gas Works estimated to be 60 lb. additional. How does Mr. White account for this excess of 93 lb. of products? Should he be at a loss so to do, we think we can assist him. To generate the quantity of gas he mentions, he uses three barrels of resin, and reckons each barrel to weigh only two cwt.; but let him look to his invoices and to the weights marked on the barrels, and he will find few of them to be less than 2 cwt. 1 qr. 14 lb., and many to exceed 2 cwt. 2 qr.; so that, instead of 6 cwt. or 672 lb., he has consumed at least 7¼ cwt. or 912 lb. of resin, the additional cost of which is 4·5d. per 1000 feet; and the sum set down for materials and fuel for 10,000 feet is thereby increased from 21s. 6½d. to 25s. 3½d. Whether a continuous supply of resin at 3s. per cwt. can be depended upon, it is scarcely worth while to inquire, but we have ascertained that it cannot *now* be had in London at less than 3s. 3d.; and should a series of deficient harvests produce a demand for American flour, and freights rise, as they have done before this, from 1s. 6d. to 12s. per barrel, resin must follow in the wake, and more than double in price,—a contingency not to be overlooked before capital is embarked in such a speculation. However, at Mr. White's price of 3s., and adding the 1¼ cwt. extra resin *which we know to be used*, and taking his figures for the other items, the cost in material and fuel for 10,000 feet of gas is 25s. 3½d., or 2s. 6·35d. per 1000 feet; and the residuary products are valued by him at 18s. 9d., or 1s. 10·5d. per 1000 feet, a valuation which, we believe, to be purely imaginary. To many of our readers who recollect the favour with which Mr. Winser's prospectus of his "National Light and Heat Company" (in which the residuary products of a chaldron of coal were estimated at £23. 2s., and the "net annual profits of the company, agreeable to the official experiments," at £229,353,627) was received by a gullible public, and who have lived to see "patent oil tar" a drug at 1d. per gallon, instead of realizing 15s. per cwt., and "patent ammonia" polluting our rivers in defiance of the law, instead of leaving 1s. per gallon in the coffers of the gas companies, to such Mr. White's present estimate will suggest some parallel; and till we have other proofs than his assertion, that these residuary products are saleable at all, at what prices, and for what uses, we cannot set at defiance the experience of every oil or resin gas company, and assign to them a fictitious, or indeed any, value, for neither in Liverpool, or Hull, or London, or Bristol, where the manufacture of resin gas (and Mr. White's is only resin gas diluted with water) was carried on for years, till the proprietors were either ruined or saved themselves from ruin by converting their works to coal gas, could anything worth speaking of be obtained from these residuary products. What market may have sprung up for them since is another question, upon which we invite Mr. White to explain himself; but, if 5d. per gallon can be obtained for resin oil, the manufacturers of turpentine will soon spoil the market; and as for naphtha such as that produced at Southport, the coal gas companies, and especially those using cannel coal, will soon beat it out of the field. Indeed, an extensive tar manufacturer at Liverpool already offers to supply resin oil at £3. 10s. per ton, whereas Mr. White's valuation is £5. 4s. 2d. for an article very much inferior. We, therefore, adhere to our opinion that the actual cost of the materials and fuel for gas made in this country from resin, under the most favourable circumstances, will be more than double that made from coal, giving an equal illuminating power.

We readily admit, however, that the apparatus now used at Southport is superior to that in which the experiments made in London were carried on, and that its results approach nearer to those of Professor Daniel; but still they fall short of them. He obtained regularly, and with certainty, 9 feet of gas 85 per cent. superior to Newcastle coal gas, from each pound of resin, and Mr. White now obtains nearly 11 feet of gas, which he states to be 42½ per cent. superior to Chester gas, made from caking coal (we presume Brymbo or some similar coal of the North Wales field); so that Daniel's results stand in respect to White's in the proportion of 16·45 to

* Coal is the fuel used by me, and the quantity referred to is sufficient to make 25,000 cubic feet by suitable arrangement of retorts.

15·62. What, therefore, can save Mr. White's scheme from the fate which attended Daniel's? Certainly not that the cost of coal gas has augmented, because the contrary is notorious; certainly not that the cost of resin gas has diminished, for we have seen that 25 years ago 5 per cent. more light was obtained from an equal quantity of resin than is now obtained. Or what can justify the circulation of such paragraphs as the following in provincial papers amongst a population without the opportunity of informing themselves, or the ability to examine such questions, when the writer must know that the price of gas in the town where he obtains his information is 8s. per 1000 feet?—

"We have seen the works in operation at Southport, have conversed with some of the commissioners at that place, as well as the patentee; and we hesitate not to declare that, upon this principle, at the present price of fuel and material wherewith to manufacture gas on Mr. White's plan, and having competent parties to superintend and manage withal, that article can be supplied even by a public company at 2s. 6d. per 1000 cubic feet, and leave more than 10 per cent. to be divided amongst the shareholders, besides providing an ample surplus fund for contingencies, repairs, wear and tear, and renewals of every kind."

We have no doubt we shall be the first to announce to the public, that the price of gas charged at Southport is 8s. per 1000 feet, and that the interest upon the money expended in building the gas works is paid by a rate upon the inhabitants; whether the profits will ever pay the interest is a matter yet to be ascertained, and many await with some curiosity to see a balance-sheet of a year's operations, as it will tend much to set at rest all speculation as to the issue of the experiment. If Mr. White will favour us with a copy of a detailed balance-sheet, when it can be drawn out, we shall be happy to insert it.

The experiment has excited some interest amongst the gas engineers of Lancashire, not because they have any confidence in its success, but because of the reckless assertions to which it has given rise, and of which the preceding quotation from a provincial paper is an example, and also from their anxiety to ascertain the truth. One of our esteemed friends favoured us some time since with the notes he took on a visit made to Southport in February last, which completely disprove Mr. White's assertion that the items of labour and wear and tear are less on his system than with coal gas; indeed, a setting of retorts had been burnt out in three months.

Gas companies will indeed be much indebted to Mr. White if he has brought to practical perfection any system for generating gas of the quality and in the quantity he states from coal tar. Let him demonstrate this, and we shall be glad to assist him in its introduction by all the means at our command.]

HYDRO-CARBON GAS.

Sir,—Some little time ago, considerable excitement was produced at a small town in an adjacent county, and which extended itself to the surrounding districts, in consequence of the adoption of a new system of manufacturing gas from certain proportions of resin, naphtha, and water. It was not only said that the coal-gas apparatus had been entirely cleared away, and other great feats were to be performed, but that the price of gas was to be astonishingly reduced.

I have since heard the speculation has proved an entire failure; that the gas was exceedingly impure and deficient in illuminating power; the supply very irregular, and the price charged, then and to the present time, still is 10s. per 1000 cubic feet; also, that new retorts are now being fixed, and other arrangements making for an immediate return to coal gas.

As so much has been said upon the subject, if you, or any of your readers, can afford further information as to the result of the experiment, I am sure it would prove interesting, especially as the publication through which this new mode of manufacturing gas was announced and commented upon, has never since alluded to it.

——, *Northamptonshire, March* 18. A. B.

[We have referred the above letter to a friend who is acquainted with the circumstances of this case, and he transmits us the following explanation, amply confirmatory of the unfavourable opinion on the Hydro-Carbon Gas project expressed in the October number of this Journal.]

"A patent was obtained last year (see the specification in the Journal for September last) for precisely the same object as that of Mr. Stephen White; professing, however, to be able to produce 100,000 cubic feet of gas from a ton of resin!!! A gentleman of high respectability, of the town in question, was induced to take it up, and the coal retorts certainly were turned, 'neck and heels,' out of doors. Meantime, its advent was duly heralded in the neighbouring and other papers, like its predecessor. On being tested, however, by disinterested parties, and its real merits ascertained, the use of water was abandoned, and a product was obtained from resin alone precisely as stated in the October Journal, viz., in round figures, 20,000 cubic feet of gas from one ton of resin and 110 gallons of oil.

"It is true, also, that the coal retorts have been refixed; but I understand this has been done rather in compliance with the conditions of the lease, which had been violated, than from a desire to return to coal, for the resin apparatus has not been removed. I am not aware whether coal or resin is now used; but, as the lessee states he can obtain 7d. per gallon for the essential oil, to be used in the manufacture of railway grease, he must be unfortunate with his furnaces if the cost of resin gas amounts to a prohibitive price."

GREAT CENTRAL GAS CONSUMERS' COMPANY.

DEPUTATION TO THE GOVERNMENT.

A deputation from the Great Central Gas Consumers' Company waited upon Lord John Russell, at the Home office, Downing-street, on Feb. 28. The deputation was arranged for the purpose of removing any misapprehension that might have been created in the minds of the Government with regard to the objects of the new gas company, projected for the supply of the city of London, during a recent interview granted by Sir George Grey to the existing companies. The deputation consisted of Mr. Dakin (chairman of the new gas company), Sir J. Duke, Bart., M.P., Mr. R. Currie, M.P., and Mr. Wyld, M.P.; also Mr. Massey, Mr. Gabriel, Mr. Bovill, Mr. Clemow, Mr. Delane (directors of the company); Mr. Wire (the solicitor), Mr. Bryden (the parliamentary agent), Mr. Croll (the engineer), and Professor Graham. The deputation was received by his lordship, accompanied by Sir G. Grey.

Mr. Dakin opened the interview by stating to his lordship, as one of the representatives of the city of London, that he was anxious to express on behalf of the inhabitants of the city of London, who took an interest in the effort now making to effect an improvement in the quality and to reduce the price of gas supplied to them, their obligation to his lordship for the ready kindness with which, amidst his pressing engagements, he had acceded to their wish for an interview. This interview they desired in order to show to his lordship that the subject had not been taken up for the purposes of private speculation, but at the instance of a large majority of his lordship's constituents, the inhabitant householders of the city of London; and he might be permitted briefly to state the circumstances which gave rise to the present application to the Legislature for interference. The city of London had for the last thirty years been solely lighted by the City Gas Company and the Chartered Gas Company, which had divided between them the entire district; the consequence of this monopoly had been that the inhabitants of the square mile, constituting the city of London—the largest consumers of gas, and the best-paying district in the world—had been hitherto greatly overcharged in the cost of this necessary commodity. In the year 1847 a return, ordered by the House of Commons to be printed, gave a statement of the price of gas, the price of coals, and the capital and dividend of every gas company established by act of Parliament in the United Kingdom. The first page of that return might be consulted to show how unfavourably the city of London stood in respect of the price of gas as compared with the towns there mentioned, and the case of Birmingham would serve to show the grievance of which the citizens complained. By that return, in the year 1846, the inhabitants of Birmingham were paying, as annual customers, 4s. 6d., 4s. 3d., 4s., 3s. 9d., with 10 per cent. off, the equation of which was 3s. 8½d.; the city of London at that time, by the same return, were paying 7s., the price of residual products nearly equalizing the price of coals. Now, the consumption of Birmingham was about half that of the City, and the length of pipe to distribute that half was twice the amount necessary to distribute double the quantity in the City; and it was an admitted truth that the cost of gas to the consumer depended more upon the cost of distribution than the cost of production; so that the city of London should on that ground be more cheaply supplied than Birmingham, instead of paying nearly twice the amount. Such facts as these, demonstrated in various instances, created great dissatisfaction in the minds of the citizens, and, when it was calculated that the gas rental was computed at about £150,000 a year, it became a subject of great importance to the trading interests. Large meetings were held at the London Tavern and elsewhere to remedy the grievance: at one large meeting, Mr. Dillon in the chair, on the 4th of February, in last year, a deputation, consisting of the chairman, Mr. Caldecott, Mr. Morley, and other influential citizens, was appointed to wait upon the board of directors of the City Gas Company, with a view of obtaining a promise of reduction, but without effect. Then numerous petitions were presented to the Court of Common Council, and by them referred to the Commissioners of Sewers, who invited the attendance of the gas companies, the directors of which still refused to reduce. The commissioners then determined to apply to Parliament, and gave notices for a bill to enable them to light the City, which it was considered desirable afterwards to drop, in consequence of having no funds applicable to that purpose; and then, in obedience to the general wish of the citizens, a company was formed for the purpose of carrying it out. He gave this detail, to show to his lordship that it was the clearly expressed opinion of the citizens, upon which the Great Central Gas Company had been acting; and he would mention that when the application was made to the Commissioners of Sewers, for power to lay down their mains, that out of 14,000 houses embraced within the area of the city of London, all the parishes, 108 in number, presented petitions in their favour, signed by 9858 ratepayers, including 272 overseers and churchwardens of parishes; that of the consumers of gas within the City, estimated at 8000, 6340, being more than two-thirds, had signed contracts to take their gas from the new company for five years; and that at the last elections on St. Thomas's Day, with very few exceptions, all the wardmotes passed votes approving of the movement. He appealed to Sir J. Duke to bear out these facts. Last year a bill was before the House of Commons, read a second time, and before a committee for eleven days, when, upon a point of form, the promoters had to withdraw it. Then the old companies reduced the price to 5s.; and when the question of allowing the new company's pipes to be laid down was about to be decided in their favour, they again reduced to 4s.; upon which a large meeting was held at the London Tavern, Mr. Dillon in the chair, and the sense of the meeting taken, when it was resolved unanimously that, under the circumstances, the new company should go on, to ensure the other advantages guaranteed under the bill, namely, the supply of metres—of services; the illuminating power according to a high standard; and a further reduction in price when auditors, to be appointed by the Board of Trade or the Corporation, should, after paying the proprietors

10 per cent., declare it possible out of profits. These were the circumstances which he was anxious to bring under his lordship's notice, and the more especially as he had reason to believe that their opponents intended to adopt the unusual method of endeavouring to throw out the bill on the second reading, without allowing its merits to be discussed by a committee; and he feared, seeing that they had obtained an interview with Sir George Grey, that they might have to contend with unfavourable impressions made on the Government. He had applied to Sir George Grey, and, in consequence of a suggestion in his letter, had sought an interview with the General Board of Health, with which they had been favoured yesterday, when Mr. Croll, the engineer, described the site of the works set apart from the City, and the proposed manner of laying the pipes; and Professor Graham described an improved mode of making and purifying the gas, by which the production of smoke and effluvia, usually accompanying such operations, would be avoided. He had every reason to think the explanations were satisfactory, and he wished to convey to his lordship the opinion expressed by Lord Ashley at the close of the interview. It was to the effect that, if the new company's plans were carried out, it would prove an inestimable boon to the poorer classes; and that, in a sanitary point of view, it appeared of great value in removing the site of an obnoxious manufacture, and improving its processes. The deputation had told the Board of Health of some facts regarding Scotland. In Dundee the population was 80,000, and the number of gas consumers 12,000; and half of that number was composed of persons whose gas rental was under 20s. a year. Gas in these towns was thus accessible to the humblest artisan, and was productive of great sanitary and social benefits. So that the population of the city of London would derive the same advantages, in regard to public health and the comforts of the poor, from the plans of the new company to cheapen the price of this necessary article.

Sir GEORGE GREY wished to state to the deputation that he had moved in the House of Commons that all bills to supply the city of of London with water should be postponed till after Easter; and, with regard to gas companies, he had been asked to adopt the same rule. He had declined, however, to comply with this request, stating that he had made his motion on the strength of a resolution passed by the General Board of Health, which had the question of water supply under their consideration; and said that, unless similar grounds were given by a resolution of the Board of Health in the case of gas, he did not think it necessary to move that bills of gas companies should be postponed. The question of water supply was a question affecting the health of the metropolis, and there were some grounds for interference. He (Sir G. Grey) had had a representation made to him by several parties; but he did not understand their application to have reference to a bill now before Parliament. Certainly, they had not asked his assistance in opposing the bill, or he would at once have refused, according to the general practice of members of the Government in the case of private bills; but they referred to a communication between themselves and Sir R. Peel, when the right hon. baronet was at the Home-office, by which they said they had been obliged by the Government of the day to enter into an agreement to ensure the public safety at that time. He (Sir G. Grey) had asked them to furnish him with their statement in writing; and, that request having been complied with, he had forwarded the document to the Lord Mayor, feeling satisfied that the corporation of London would do nothing to endanger the interests of the citizens. But he had given no intimation whatever of any interference on his part, unless some recommendation was brought before him officially from the Board of Health, such as the resolution of that board with respect to the supply of water, to which he had already referred.

Mr. WIRE said he was prepared with a written statement on the part of the new company, which he thought a complete answer to the statement made by the other parties, many parts of which were fallacious, and others untrue.

Lord J. RUSSELL said he regretted that he had not time to attend sufficiently to these subjects, considering the various duties of a public nature which he had to perform, and if he entered into the case of the deputation he would be obliged also to consider that on the other side. Therefore he had abstained hitherto from taking part in any private bills. He must say he thought that Sir J. Duke and Mr. Masterman, who both represented the interests of the City, were well able to state the whole case so as to enable the House of Commons to come to a right decision.

Sir J. DUKE said that, as one of the representatives of the City, he wished to state a few facts regarding some misrepresentations that he understood had induced the noble lord to say he would oppose the bill.

Lord J. RUSSELL would certainly not take any part in the opposition to the new company's bill.

Mr. DAKIN said that the new company contemplated having their works several miles from the City, thereby preventing any public nuisance arising from the manufacture of gas. The site would be near some factories of a different description, and he believed that the new company's manufacture would even purify theirs. All they asked was not to be interfered with in getting their bill before the proper tribunal, viz., a committee of the House of Commons.

Lord J. RUSSELL said that the House of Commons would decide that point.—The deputation then withdrew.

CITY COURT OF SEWERS.

MARCH 13.—A court of the gentlemen connected with the above-named commission was this day held at the Guildhall, Deputy Peacock in the chair.

Mr. H. L. TAYLOR said he perceived it was currently reported that Messrs. Peto and Betts had thrown up their contract with the company, and that, consequently, shares to the amount of £50,000 had been returned. He wished to know whether the commissioners had heard anything of such circumstance?

The CHAIRMAN: What have we to do with that?

Mr. H. L. TAYLOR thought that the commission had a great deal to do with the matter. How were they to be indemnified for the proper reparation of the streets if the security failed?

Mr. BLAKE said that, in answer to his friend Mr. Taylor, he might say that, although Messrs. Peto and Betts had not taken the contracts, other parties had done so.

Mr. WALKER knew such to be the fact.

Alderman FINNIS observed that the change of hands had arisen from the circumstances of the great competition which had taken place with regard to the matter.

Deputy HARRISON said that it was the plain truth that arrangements as to the fulfilment of the contracts had been completed with other parties, and it was only right that the public should be informed of the circumstances.

Mr. H. L. TAYLOR replied. The reason why he had asked the question was that the public might be so informed.

The conversation then dropped.

The REMEMBRANCER then said that he attended there in his official capacity for the purpose of presenting a petition to Parliament against the bill of the Great Central Gas Consumers' Company, inasmuch as he considered that the clauses introduced into that bill did not carry out the views of the commissioners as expressed in the resolutions passed by the court. The petition was then read. The following is a copy:—

"TO THE HONOURABLE THE COMMONS OF THE UNITED KINGDOM, IN PARLIAMENT ASSEMBLED.

"The humble petition of the Commissioners of Sewers of the City of London,

"Showeth,—That a bill is depending in this honourable House 'For better supplying with Gas the City of London and the Liberties thereof, and certain places adjacent thereto.'

"That by virtue of 'The City of London Sewers Act, 1848,' the sole power of cleansing, lighting, and improving the several streets, and of entering into contracts with gas companies and other persons for supplying with gas the city of London and the Liberties thereof, is vested in your petitioners; and the property of the pavements and other materials in the carriage and foot ways of the said city and liberties is also vested in your petitioners.

"That it is proposed by the said bill to authorize the company to be thereby incorporated to continue, make, construct, lay down, maintain, alter, or discontinue such pipes; and to construct, erect, and continue such retorts, gas meters, receivers, and buildings, cisterns, engines, machines, and other apparatus; cuts, drains, sewers, watercourses, reservoirs, machinery, and other works; and to do all other such necessary acts and things as they shall think proper for supplying the inhabitants, and all public and private buildings, and all public and private lamps, within the limits of the said act, with gas; and also to manufacture or purchase, and to contract for gas, and for the supply thereof, and to sell gas, and to sell, dispose of, or manufacture the coke and other residuary products arising from the materials used in the manufacture of gas, in such manner as the company may think proper.

"That your petitioners respectfully submit to this honourable House that it is necessary, for the protection of the public, that clauses should be inserted in the said bill for regulating the taking up pavements in the city of London and the liberties thereof by the said company, previously to laying down new lines of pipes, and for reinstating such pavements, and the payment of the expenses thereof, and of any damage to be done thereby, and for keeping such pavements in repair, and providing for the terms upon which the said company shall supply the public and private lights in the city of London and the liberties thereof, and for regulating the illuminating power and quality of the gas to be supplied by the said company, and for limiting the amount of dividend to be paid by the said company, and for empowering the Corporation of London to appoint inspectors of gas and of meters, and other works of the company, and also for saving the rights of your petitioners.

"Your petitioners, therefore, humbly pray that they may be heard by themselves, their counsel, agents, and witnesses, before the committee on the said bill, against such of the clauses of the said bill as affect the rights, interests, and privileges of your petitioners; and that proper clauses for the purposes aforesaid may be inserted in the said bill.

"W. A. PEACOCK.
THOMAS Q. FINNIS.
THOMAS WATKINS.
T. J. HOLT.
THOMAS HALL.
H. LOWMAN TAYLOR.
"JOSEPH DAW, Principal Clerk to the said Commissioners of Sewers."

"JOSHUA T. BEDFORD.
HENRY BLAKE.
EDWARD HARRISON.
R. B. WHITESIDE.
WILLIAM RATHBONE.
JOSEPH MORRIS.

Mr. WHITESIDE moved that the petition be signed by the clerk on behalf of the commission.

Deputy HARRISON said that, as that was a mere formal mode of complying with the orders of the court, he would most willingly second the motion.—Agreed to.

MARCH 20.—A court was this day held at the Guildhall; Deputy Peacock in the chair.

Mr. ELLIOTT observed that it was not his intention to take up much of the time of the court in introducing the motion of which he had given notice. Those who knew him would give him credit for not needlessly dragging the subject of the gas and the pavements before the commission, but he must say that it was from a strong sense of duty alone that he brought the question forward. The matter before them was of the utmost importance, not only to the citizens of London, but to the entire metropolis. It was one of the most important that could be considered by any municipality, and he did think then, as he had said before, that the commissioners had granted powers to the Great Central Gas Consumers' Company, without due and proper consideration and inquiry. If it should turn out that they had done so, they had most seriously compromised themselves with their constituents and the world, and for such acts they might have to answer if they did not retrace their steps while they had the opportunity. He thought that upon previous occasions they had not fully considered the question, and he now asked them to accede to his humble motion, so they might not commit themselves before they had made the fullest inquiry. It was his opinion that, even if the citizens of London obtained gas from the new company, which he much doubted they ever would, twenty or thirty per cent. cheaper, that the evils arising from the breaking up of the pavements, and the cost that would necessarily ensue, would render the proffered good a positive evil, and that it would prove to be the dearest bargain in the end that they had ever undertaken. All he asked for was inquiry, for a special inquiry; and that opportunity would be afforded to them if they agreed to his motion. He did hope that they would agree with him in thinking such a course to be desirable, as it was right that the public should be properly informed upon the matter,

and that the commissioners should be undeceived with regard to the representations which had been made by the talented advocates of the new company. He thought he was justified in asking the commission to send their talented and impartial surveyor to Dublin, that he might report upon the extent of the gas pipes which had been laid down at night in that large city, and the effect of the same upon the pavements of that city. No harm could come of such a course, and they would not be labouring on in the dark upon such an important question. The statements which had been made from time to time, as to the laying of pipes in Dublin, he believed, from documentary evidence he held in his hand, to be false in fact, and in some instances, indeed, monstrously untrue in reality. But Mr. Charles Pearson had told them that the pipes in Dublin, of which Mr. Pearson, on the 3rd of December last, said he had "seen a plan," that they were "interlacing each other," and that they were "laid at night." Now, they had believed Mr. Pearson; and they were bound to believe what that gentleman stated; but since then they had found out, by letters received from Dublin, that Mr. Pearson had been misinformed, and, therefore, that Mr. Pearson had—he (Mr. Elliott) would not say intentionally—but that he had in reality misinformed them. Now, it was due to themselves, and, indeed, it was due to Mr. Pearson, that they should send their surveyor to see what had been done, and what injury had occurred to the pavements in Dublin by the breaking up of the streets there. He was convinced that nothing less than this course would satisfy the public. Why, there was scarcely anything more delicate than an interference with well-laid pavement; it never could be restored to its original value after it had been broken up for the insertion of piping; and it was a fact well known that where gas pipes were laid, and charged with gas, the ground was saturated with carburetted hydrogen, and that product was so extremely subtle that, wherever there was the slightest fissure, the deleterious gas oozed into the sewers, or impregnated the water-pipes, and of course any disarrangement of the pavement might and would render these evils manifold, and, if done to the extent proposed, might prove serious. Therefore was it necessary that Mr. Haywood should be sent to examine and report upon the matter. Then he wished to observe that this question was not only a gas consumer's question, it was a question affecting not merely the 8000 gas consumers, but the 16,000 ratepayers of the city of London. It was the ratepayers who would have to be answerable for the great cost of restoring the pavement.

Deputy Harrison: Do you mean to say that the expense of doing this work would have to come out of the pockets of the ratepayers?

Mr. Elliott did say so, and he said so again, notwithstanding he might be told that the company would "guarantee" to pay the cost. Interference with the pavement was a difficult matter, and he would assure them that, guaranteed as they might be, still the ratepayers would have to pay. He considered, therefore, that they, as commissioners, were bound to protect the ratepayers, and also those who had been beguiled into the taking up of shares in this "Great Central Gas Consumers' Company." ("Hear, hear," and laughter.) They might laugh, but was it not already a most ominous fact that out of the £150,000 to be subscribed by the shareholders, that a call had already been made for £45,000? Was it not also the fact that two parties whose names had given stability to the scheme—Messrs. Peto and Betts—had withdrawn from it? Was not this ominous? It was a fact to his mind, looking at the company as now composed, that there was not in the concern a sufficient amount of money respectability; it did not stand in that money position which it ought to do in order to be recognised and treated with by them as the representatives of and the protectors of the funds of the ratepayers. The amount of Royal Exchange respectability required was wanting. (Laughter.) Had Mr. Baring, or some other great capitalist, put their mark upon it, the matter would have been different. It was time, therefore, for them to prevent the affair from going much further; they ought to be satisfied, and to give way to inquiry. He need not say much more, as he believed he had made out a *primâ facie* case as to the necessity for such an inquiry, and therefore he begged leave to move—"That the surveyor be directed to proceed to Dublin, to ascertain and report upon the extent of the gas pipes that have been laid down there during the night, and the effect thereof upon the pavements of the streets of that city; and that the Great Central Gas Consumers' Company be prohibited from disturbing the pavements of the city of London before such report shall have been made and considered."

Deputy Harrison thought that the latter part of the motion, having been before agreed to, could not be entertained.

The Chairman overruled the objection, and inquired whether any one seconded the resolution.

Deputy Lott would do so. He did so most willingly, believing that Mr. Elliott had made out a *primâ facie* case for inquiry. The mover had clearly shown that they had been misled in matters of fact, and that they had been imposed upon in a very gross manner. When they met on the 3rd of December to discuss the question, how were those treated who differed from the promoters of the new scheme by parties below the bar? How? Why, they were saluted with groans and hisses, and execrations of a most disgraceful character. He considered that justice had not been done in the matter, and therefore he would support the motion.

Deputy Corney submitted whether the result sought for by Mr. Elliott could not be obtained by some other means than by sending a professional gentleman to Dublin to make inquiries. He was in favour of inquiry certainly, but documents might be obtained sufficient to satisfy everybody. He wished to know, as there were many reports abroad respecting the new gas company, whether the directors intended to lay down their pipes before they built their works, and consequently before they could supply the gas? He had heard so from a respectable source; and he had further heard that an order for pipes to the amount of £10,000 had been given.

Mr. Hardwick (solicitor to the new company, and one of the commissioners) said that the worthy deputy and the court would remember that the company, according to the deed, could not lay down a single pipe until they had satisfied the commissioners that they were positively in possession of £75,000; and that was one reason why a high call was made.

Deputy Harrison remarked that no doubt the company had given an order for their pipes, because they could just now purchase iron very advantageously. That had nothing in the world to do with the erection of premises.

Deputy Corney had further heard that there were in the way of the promoters considerable difficulties as to the way in which the company were to get to the City, even when they did get their works complete. They had proposed to bring their pipes by the Blackwall Railway, but several parties who had obtained leases of the arches had refused to permit them to do so. (Hear.)

Alderman Lawrence remarked that, as a principle, he was always averse to having a subject which had been discussed and settled raked up afresh; still there might be a new state of circumstances arise which made inquiry and investigation absolutely necessary. He had no doubt they all remembered that a certain scientific body was once asked why, if a pail of water was filled to the brim, and a fish of a pound weight thrown into it, the water would not run over? All sorts of reasons were assigned, and all sorts of conjectures ventured, till at last one of their number suggested that the experiment should be tried. (Laughter.) They knew the result, and it struck him that the court was very much in that position with reference to the present question. But why go to Dublin for information? Supposing that they found, upon inquiry, that the pipes were laid down in that city by night, it did not argue that that was the best course to be pursued in reference to themselves. They all knew that the process of laying down gas pipes was an extremely difficult one; that it required the greatest nicety to ensure the joints being sound, and of course that it could not be so well done by night as by day. They need not go to Dublin to learn that fact. Then, with regard to the pavements, it was certain that even in the day the work was an exceedingly difficult one, and that it was next to impossible, after they had been once broken up, to make them as sound as before. That, too, was not a Dublin, but a London question. He would not have alluded to the matter if a new state of circumstances had not arisen to bring the matter before the court; but as it was he might as well go into it. They were assured, in the first place, of the perfect safety of laying down the pipes by night. They now found that was not the fact—(hear, hear)—and the reason why he said so was, that it had been publicly denied in that room, and not one of the advocates of the new company dared to reply to that denial. (Hear.) That was perfectly sufficient to his mind, and he thought must be to every one present, that the first statement was not correct. It was perfectly true that a small portion of the Dublin streets was broken up, but not all. The statement, though to a certain extent true to the ear, was not founded on fact, and, therefore, the court was deceived by the assertion. He must say that it was not fair play, and the parties with whom such a statement originated, when they discovered their error, were bound to come to the court and state that they had been misled; or, he must confess, he believed they knew it before, and stated it with the intention to deceive. (Hear.) Then, again, it was affirmed in the early part of the debate, that the commissioners might rest perfectly sure that the whole of the works would be erected, and the agreement with the court satisfactorily accomplished, because some eminent contractors had not only taken the contract, but, possessing the greatest confidence in the undertaking, had also taken a large number of shares. In his mind that statement removed many difficulties, because he knew the contractors referred to were men who could themselves have carried out the whole concern. But, even then, he confessed he had his doubts whether such was really the case, and said more than once to some friends that he believed the contract was a contingent one. It now appeared that they refused to carry it out, and, therefore, he thought he was justified in the opinion he had formed. When a contract was made, it was generally done under seal, and of course could not be broken without another executed in the same way.

Mr. S. Cardwick (interrupting): Well, then, I say that the commissioners of sewers cannot break the contract they have entered into with this company, which is also under seal. (Hear.)

Alderman Lawrence said what was only a suspicion in his mind before, was now confirmed by the remark of Mr. Cardwick. He said the commissioners could not break their contract. (Hear.) Well, then, in reply he would observe, that, as the Great Central Gas Company had——

Mr. S. Cardwick: I beg to explain. There was a conditional contract made between the company and Messrs. Peto and Betts, that, provided the company delivered to them possession of certain land to enable them to commence their works by a certain day, the terms of the contract on their part should be binding. (Hear.) The company did not deliver possession, and therefore the contractors were at liberty to throw up the work. (Hear.)

Alderman Lawrence was much obliged by the statement, and he ventured in his place to say that the Central Gas Company never did bind themselves, in the proper sense of the word, to that contract. It was a deceptive binding. They took care never to have possession of the land; they reserved to themselves the right not to take it; and they bound the contractors to a condition, the fulfilment of which they had the power to prevent. It was certainly the most disingenuous, not to say disgraceful, mode of proceeding which he had ever known to be adopted by a public body, not only towards Messrs. Peto and Betts, but towards that commission. He must say, they set a trap for the unwary, who trusted to the magic of words, and believed them to be the representatives of facts; and, therefore, he considered the whole affair was a gross deception. Again, was it not said, over and over again, that the works were to be erected somewhere in the neighbourhood of Bow-common? No wonder that unsophisticated folks thought it strange to hear that the company

were trying for ground in the parish of St. Pancras. They were told that, in that latter place, they were refused permission by the parochial authorities, and that the governors of St. Bartholomew's Hospital would not give their consent. But what did they want in that parish at all? Could the court be surprised that Messrs. Peto and Betts threw up the contract when they found they were being made a "shoy-hoy" to the world, that they were interested in the works? (Hear.) From a personal acquaintance with one of those gentlemen, he might say that he was sure they would not be willing parties to say such a contract unless they had thought that they were dealing with honourable men. He would advert to another point. He had ventured to ask some of the leading friends of the new company—"How is it possible that the city of London should be supplied with gas by your company at midsummer next? I do not hear of there being a single brick on the ground?" "Oh," they said, "Messrs. Peto and Betts have taken the contract, and you are sure they will carry it out; and, as we have advertised for a contract for the pipes, and you have given us permission to lay them down, nothing could be more easy." He (Alderman Lawrence) confessed that nothing was so easy as to break a contract like that, and with it destroy the hopes of those who had had the folly to trust in it; but at the same time he must say that it placed the whole concern in a most disreputable position. (Hear, hear.) Notwithstanding, therefore, his aversion to the introduction of matters upon which a decision had been come to by the court, he felt bound to say that the commissioners ought to know how they had been treated. He did not, however, see the necessity of going to Dublin for information; they were all agreed that the work could not be done so well by night as by day; and that being the case, and as the solicitor of the new company told them their contract could not be taken, they must adopt some other course to meet the exigencies of the matter. He had often wondered, since the statement had been made, that the contract with Messrs. Peto and Betts had been thrown up, how they managed to get out of it. The thing was now plain. It was a conditional contract, and they, silly men, had thought that the company would give them possession of the land, and enable them to complete the works by midsummer. But the directors knew better; and the contractors, finding that at Lady-day they could not get the ground, were obliged to say, "We must throw up this valuable contract," for, if Government were taking off the duty on bricks, it might, perhaps, have turned out so to them. ("Hear," and a laugh.) But, perhaps, he ought to give the company credit for great sagacity in getting out of the contract, that they might have all the benefit themselves of the duty off bricks. (Hear, hear.) Now the public were being told that they had got a new contractor on the same terms. What! to be caught in the same trap about the ground?

Mr. Hardwick: No, that is not the case.

Alderman Lawrence: It is said out of doors, and it has appeared in print, that the contract has been taken by other parties on the same conditions. (Hear.)

Mr. Hardwick: No, on equally advantageous terms. (Laughter.)

Alderman Lawrence: Equally advantageous terms! That was to say, on the part of the company ("hear, hear," and a laugh), allowing them, whenever their interest or inclination prompted them, to slip out as they did before. (Hear.) Well, he would accept that as the real state of affairs, as it was rather confirmatory of the position he was laying down. Equally advantgeous terms! That was, that, whenever they chose to give up the ground—which, by the way, he had great doubts of their being in possession of—unless, indeed, it was on some similar conditions, namely, upon Messrs. Betts's contract, or upon the bill passing the Legislature, or some other contingency, which they had themselves the power to settle.

Deputy Stevens: That is making out a large body of men to be a set of knaves.

Alderman Lawrence would be sorry to say anything against his friend, who might in the present instance be rather taken in himself, and he would beg to be understood that in all his observations he did not at all impeach the honesty of the shareholders; it had affected their credulity, and it might affect their pockets; but he contended that it appeared those who had managed the affairs were in exactly the position he had stated; and as the contract was, according to their solicitor's statement, made on "equally advantageous terms," of course there was the same loophole for their escape as there was with Messrs. Peto and Betts. (Interruption.)

Mr. Hardwick: I beg to say that——

Alderman Lawrence would not pursue that course of speaking any longer. He hoped he had shown enough to convince the court of the false position it was occupying with the company. Then as to the question of the pavements. It was a very serious thing, if the laying down of pipes and replacing the pavements could not well be done at night, they ought to know it. (Hear.) He did not think they ought to escape from the deed, nor would he ask the court to do it. Never, since he had had a seat in the corporation, had he sought, by a factious opposition, to abrogate any agreement it might adopt, though he had often been in a minority (hear); but he did think that the new state of things which had come to their knowledge required that they should institute every inquiry, that they might act accordingly. In reference to the remark of the worthy deputy (Corney) on the amount of £75,000 stipulated to be paid before the works were commenced, he really thought at the time it was very fair, although he had hinted that, possibly, it might be all laid out in buildings, &c. He would recommend the court that, under all the circumstances, as they were bound by a contract to agree, under the advice of their surveyor, to waive that condition of it which required the company to lay down their pipes by night, and in reference to the whole affair to admit at once that they had been deceived, but at all events not to stop inquiry. Let them satisfy themselves on every point, for that he apprehended was the meaning of the motion; and if, upon inquiry, it should be found that the terms of the contract could not be complied with, with advantage and safety, let them take such steps as might be deemed advisable.

Mr. Hardwick then said that he was not at that court in his capacity of solicitor to the Great Central Gas Consumers' Company, but as a commissioner of sewers. He did not, however, feel called upon to give any opinions with regard to the strange statements which had been made by the alderman who had just sat down; but this he would say, and he staked his reputation upon the fact, that a full and complete answer would be given to all the allegations.

The motion was then put and lost, three hands only being raised in favour of it.

Alderman Lawrence then proposed that the surveyor be instructed to report upon the possibility of laying the pipes by night, and that he further give his opinion upon the probable consequences of the same to the City pavements.

Deputy Corney seconded the motion.

Mr. R. Taylor said that that was a question which always was raised as an objection to the introduction of any measure, however good, either as to gas or water in the City. The object of the opposition was palpable: it was to uphold a great and monstrous monopoly, while the tradesman might still groan, and no redress could be had in consequence of the bugbear of "tearing up the pavements."

Alderman Hunter supported the motion.

Mr. Hall warmly defended the Great Central Gas Company. He stated that it was his impression that, as the commissioners had agreed to permit the company to open the streets by night, that they were bound to adhere to the terms of the deed. He had the utmost confidence in the promoters of the company, and he believed that, if they did not succeed in carrying out the work they had commenced, it would be because of the opposition of wealth and talent now raised so powerfully against them.

Mr. Whiteside objected to the motion. He contended that nothing would be gained if they had the report.

Deputy Pewtress considered that the discussion which had taken place that day was altogether irregular and out of order, and——

Upon the suggestion of Mr. Hall, the application was unanimously refused.

After the transaction of some other comparatively unimportant business, the commissioners adjourned.

WHITECHAPEL ROAD TRUST.

On Monday evening, the 25th of March, a deputation from the company attended the board, which was unusually large. Mr. Dakin, the chairman of the company, addressed the commissioners in support of a memorial from the company for permission to lay mains through the district for the purpose of connecting their works with the city of London. It was represented that the site of the works would be at Bow-common, not far from those of the Commercial Gas Company. The irresistible bait of "cheap gas" was held out to the commissioners, which indeed may be regarded as the only argument, as the public character of the undertaking, &c., too obviously partakes of a private speculation. Mr. Tyrrell, the solicitor to the City Gas Companies, also attended, and was called in after the deputation had retired. In ignorance of what had transpired before he was admitted, he said he was obliged to assume that the deputation had offered their usual temptation of cheap gas. Several consumers replied they had offered gas at 4s. per 1000 cubic feet. Mr. Tyrrell stated that he could not pretend to advance any argument against the acceptance of the offer made by the deputation, as it was obviously the interest of every person to have gas at 4s. instead of 6s., assuming the quality was equally good. He, however, warned the *consumers*, when depending upon the promises of the company, they (the *consumers*) would have first to grant leave for the laying of the pipes, and to rest upon the promises of the company for the supply of gas at 4s. It was to the value of these promises he felt it his duty to his clients to draw the attention of the trustees. The City Gas Companies had caused to be investigated, by persons of the highest repute, the estimates upon which the new company had put forth their pretensions; and it was the unanimous opinion of the scientific gas engineers so consulted that the Great Central Gas Consumers' Company could not, with £250,000 (their nominal capital), effect the supply of the City, without regard to the price of the gas; that their nominal capital had not any relation to their *actual* capital, for they had started with £150,000 instead of £250,000, and of the less sum £50,000 had, upon the withdrawal of Messrs. Peto and Betts, been reduced to £100,000; and that even of this sum much doubt was entertained as to the fact of *bonâ fide* subscription; and it was well known in the city of London that many of the shareholders, consumers of gas, had expressed their wish to withdraw, now that they were supplied at 4s., and many refused to pay up their calls; so that the establishment of the company had yet to be proved.

That, in the arrangement with the Commissioners of Sewers of the city of London, the company had to prove the payment of £75,000 on their shares; that such had not yet been done, and the company had every appearance of being one of those companies of which many had commenced an existence without arriving at maturity; or if, unfortunately, they had become established, the shareholders derived little or no return for the investment.

The object of his (Mr. Tyrrell's) interference was to induce the trustees to inquire before they came to a conclusion, though this was scarcely to be expected, as the offer of 4s. would doubtless delude them into accepting it, and it would be for them to secure to themselves, as they might be advised, the performance of the promises held out as the inducement for the leave to lay the pipes of the new company.

The board resolved to allow the pipes to be laid, upon the companies binding themselves to supply the parish of Whitechapel with gas at 4s. in twelve months.

On Wednesday evening, March 27, a meeting of the Commissioners of Pavements for the district of High-street, Whitechapel, was held, to receive a deputation from the Great Central Gas Consumers' Company, in support of the memorial for leave to lay pipes in the district, nearly similar to that at the meeting on Monday, before the board of the other district. The deputation attended, and again Mr. Tyrrell, on behalf of the City companies, was heard, when the commissioners came to the following resolution:—

"That upon £1000 being deposited in the hands of the treasurer of the commissioners, and the company entering into a deed of covenant as to laying down the mains within twelve months in the rest of the parish, the company were to have permission to break ground."

Parliamentary Intelligence.

HOUSE OF COMMONS.—MONDAY, MARCH 11.

Petitions, praying to be heard by themselves, their counsel, or agents, against the Great Central Gas Consumers' Bill, were this day deposited at the Private Bill-office by the following parties:—

1. Trustees of Middlesex and Essex Turnpike Roads.
2. Merchants, bankers, &c., owners and occupiers of property within the city of London, &c.
3. Owners and occupiers of property within the parish of Bromley St. Leonard's.
4. The Gas Light and Coke Company.
5. The City of London Gas Light and Coke Company.
6. Commercial-road Trustees.
7. Independent Gas Light and Coke Company.
8. Commissioners of Paving, Lighting, &c., the parish of Christchurch, Middlesex.
9. Ratcliffe Gas Light and Coke Company.
10. Imperial Gas Light and Coke Company.

TUESDAY, MARCH 12.

The following additional petitions were this day deposited against the Great Central Gas Consumers' Bill:—

11. Ratcliffe Paving Commissioners.
12. Vicar, churchwardens, &c., of the parish of St. Pancras.
13. British Gas Company.
14. Owners and occupiers of property within the parish of St. Dunstan's, Stepney; St. George's-in-the-East; St. Botolph Without, Aldgate; and St. Mary, Whitechapel.
15. Inhabitants, owners, and occupiers of property, &c., in several parishes and places in the county of Middlesex,
16. Commissioners of Sewers of the city of London.
17. Commissioners of Goodman's-fields Pavements.
18. Commissioners of Whitechapel High-street Pavements.
19. London Gas Light and Coke Company.
20. Commissioners of Paving, &c., Camden-town.
21. Owners and occupiers of houses in the district included in the bill.
22. Owners and occupiers of property in the parish of St. Leonards', Bromley (No. 2).
23. Commercial Gas Company.
24. Lessees and occupiers of houses in the parishes of St. Pancras, and St. Mary (Islington).

PAROCHIAL ASSESSMENT AMENDMENT ACT.—April 8.

Mr. C. LEWIS moved for leave to bring in a bill to amend the laws relating to parochial assessments in England. The object of the bill was, without making any alteration in the legal relations with respect to the valuation of rateable property in England, to establish a more uniform principle for its assessment. For this purpose he would propose to repeal the act known as Mr. P. Scrope's Act, and also the act which regulated the valuation for the county-rate, passed a few years ago, and, in their place, to establish a uniform set of regulations for the assessment of the poor-rate and county-rate. The bill would contain clauses authorizing the justices at quarter sessions to appoint a permanent committee from their number to be called "the assessment board." This committee of the magistrates would have a general control over all the assessments of the rateable property of parishes. The assessment would, as at present, be made by the overseers; but the assessment board would exercise a control over the assessments for the purpose of enforcing uniformity. The bill contained a clause defining the principles upon which rateable property was assessed, expressed in more accurate terms than the clause in the present Parochial Assessment Act, and a clause defining the principle upon which the tithe commutation was rateable in England. That was a matter upon which great difference of opinion existed, and it was hoped the clause would set the question at rest.

Leave was given to introduce the bill, which was brought in and read a first time.

Review.

Practical Remarks upon the Rating Railways, Gas, Water, and other similar Companies, &c. By Charles Penfold, Surveyor. Baldwin, London. Second Edition.

The author of this little work is well known to many gas companies who have been the victims of his crude and imperfect knowledge of the practical operations of a gas work, of which one instance was given in our July number, and to which we are indebted for the present edition of the work. Many other parties may be threatened with a similar visitation, and a short history and exposition of the law and practice applied to such cases may not be unacceptable to many of our readers before entering upon a critical review of the present work.

In the earlier stages of gas lighting it was contended that the *works and stations* of gas companies were alone liable to be rated to the relief of the poor and other parochial burdens, until the case of the *King* v. *the Birmingham Gas Co.*, and the *King* v. *the Brighton Gas Co.*, decided that the mains and pipes were equally as subject to these taxes as were the works and stations; still many minor points remained unsettled; and the statute known as the Parochial Assessment Act, which declares that all fixed properties, all properties that are attached to land, should be rated at such sum *as a tenant will give*, supposing that he pays all parochial rates, taxes, and other outgoings, indicated clearly the intention of the Legislature that all such properties should be taxed upon the amounts which the *owner* can put clear into his pocket year after year without any personal exertion or trouble whatever. The questions, therefore, to settle are the legal and just mode of ascertaining the rent a tenant will give, and the mode of apportioning this rent among the different parishes in which the property is situated.

The first difficulty arises in consequence of most gas companies being, at the same time, *owners* and *occupiers* of the property to be rated. To rate them upon the balance of the excess of receipts over expenditure would be to rate their *profits as occupiers*, which is clearly not contemplated by the Parochial Assessment Act; and it was, therefore, requisite to devise some system by which their profits as *tenants* or *occupiers* might be separated from what they received as *owners*, it being upon the latter alone that they were rateable.

Several plans were suggested, but the one more generally practised for many years by surveyors and valuers was to ascertain the value of the land occupied, adding to it the structural value of the buildings and other constructions placed upon it, and then to apply an arbitrary per centage, which gave what was called the rent. The case of the *Queen* v. *the Cambridge Gas Co.* upset all such theories, and called from Lord Denman the emphatic expression of his opinion, that "cost was not the measure of value." Were such a system as this tenable, a gas work and its pipes constructed on Salisbury-plain would be of equal rateable value with one of the same calibre situated in the midst of a thriving and populous city; a proposition which no one, we apprehend, will venture to maintain in the face of the clear and precise terms of the Parochial Assessment Act, which enacts that "no rate for the relief of the poor in England and Wales shall be allowable by any justices, or be of any force, which shall not be made upon an estimate of the *net* annual value of the several hereditaments rated thereunto; that is to say, of the *rent* at which the same might reasonably be expected to let from year to year, free from all usual rates and taxes, tithe commutation, rent-charge, if any, and deducting therefrom the probable annual cost of the repairs, insurance, and other expenses, if any, necessary to maintain them in a state to command such rent."

As the case of the *Queen* v. *the Cambridge Gas Co.* has exercised an overwhelming influence on all questions of this nature, and is remarkable for the blunder committed by the parties entrusted with the interests of the gas company in admitting the amount of rent which a tenant would give for those works to be the balance of the excess of receipt over the expenditure, so is it worthy of record, as the first decision of the judges, in which several important points in the rating of gas works were settled, the principles of which have never been impugned; and for these reasons we shall quote it at length:—

"THE QUEEN *v.* THE CAMBRIDGE GAS LIGHT COMPANY.

"On appeal against a poor-rate for the parish of St. Mary the Great, in the town of Cambridge, wherein the Cambridge Gas Light Company was assessed at £70 for 'the mains and other pipes, and other apparatus for the conveyance of gas, belonging to the company, situate, being, lying, and fixed in the ground in the parish of St. Mary the Great,' the sessions confirmed the rate, subject to the opinion of this court upon a case which was substantially as follows.

"*Case.*

"By stat. 4 and 5 Will. IV., c. 24 (local and personal public), entitled 'An Act to incorporate a Company for better supplying with gas the town of Cambridge,' &c., certain persons and their successors were incorporated by the name of the Cambridge Gas Light Company, for the purpose of making coal gas, coke, &c., and for lighting and supplying with gas all persons, and all colleges, halls, public places, roads, streets, &c., and any churches, chapels, theatres, &c., and private houses, shops, counting-houses, warehouses, manufactories, &c., within the town and University of Cambridge, or the precincts and neighbourhood thereof respectively; and they were empowered to sell such coal gas, coke, &c., in such manner as they might think proper. The company was also empowered to erect retorts, gasometers, &c., upon any lands which they might purchase for that purpose, and to break up the soil and pavement of any of the footways and carriage-ways of any roads, streets, &c., and other public passages and places, and also (with consent of owners and occupiers) of any private ground, &c., in the said town, and to make culverts, &c., and to dig trenches and drains, and to lay mains and other pipes, and put stopcocks from such pipes from the gasometer and other works, in, under, and along such public places, &c., as aforesaid, in such manner as should be necessary for carrying the act into execution, or supplying such lights as aforesaid. Powers were also given to the company to contract for lighting with the commissioners for lighting and paving the town of Cambridge, and with any persons, bodies politic, corporate, or collegiate, &c., within the town and University of Cambridge respectively.

"It was also provided that, for all the purposes of the act, the town and University of Cambridge should comprise and be deemed co-extensive with the fourteen parishes in the said town.

"In pursuance of the said act, the company have purchased lands and premises in the parish of St. Andrew the Less, within the town of Cambridge, and erected thereon buildings, gasometers, retorts, and other necessary works and apparatus for making gas and coke, and have broken up the soil and pavement of the several public streets and ways, and (with the consent of owners and occupiers) of divers of the private grounds, &c., in the several parishes, and have fixed therein proper mains and pipes for the conveyance of gas along the streets and into the several colleges, halls, shops, &c., of the university and town. They also manufacture for sale a considerable quantity of coke and tar at their said works and premises in St. Andrew the Less. The several colleges and halls in the university were all founded before 43 Eliz. (1601), except Downing College, which was founded in 1800, and, with the exception of Downing College (and of some modern additions to others), no college or hall in the university is, or ever has been, rated to the relief of the poor. The various parishes, however, in which the colleges and halls are locally situate, in perambulating their respective boundaries, have been accustomed to go into and pass through the colleges and halls, and to affix their boundary marks therein. Several of the colleges and halls are lighted by the company with gas, which is supplied from their works by the mains and pipes fixed in the ground, and which pass into and through various parishes as aforesaid, and among others into and through the parish of St. Mary the Great.

"The lands, buildings, gasometers, retorts, and other works and apparatus for making gas, coke, and tar, together with the mains and pipes for conveying gas through the town, colleges, and halls, would let to a responsible tenant at a rent of £2400 a year, the tenant paying all rates and outgoings for making the subject of the occupation productive, and doing all the ordinary repairs required, but not providing for the renewal of the various works when necessary, which renovation would cost upon an average £500 a year, viz., for the buildings and main pipes £300, and for the gasometers and other more perishable articles £200. The rent of £2400 also includes the mains, pipes, and apparatus in those colleges and halls which are not assessed to the relief of the poor, the value of which mains, &c., so included, is £350 a year.

"The gas consumed in St. Mary the Great is conveyed into and through it by mains and service pipes sunk and affixed in the soil. The sum received by the company for gas thus conveyed and consumed by the parish is £763. 18s. 8d. per annum. The assessment in St. Mary the Great has been confirmed upon the assumption that £2400 is the sum at which the works, mains, pipes, and apparatus of the company are liable at law to be rated to the relief of the poor, and that that sum, after deducting £150 for the value of the buildings and works at the manufactory, ought to be distributed amongst the *different parishes* through which the mains and the pipes are laid, *with reference to the annual receipts by the company for gas supplied in each parish respectively*. If this be correct, £70 is the amount at which the company should be assessed in St. Mary the Great.

"The company contend that, assuming the sum for which the works, &c., would let, to furnish the proper criterion of the annual value for the purpose of rating, they are entitled to make from the said sum of £2400 the following deductions:—

For the annual cost of the renovation of the various works as before mentioned	£500	0	0
For the annual value of their mains, pipes, and apparatus within those colleges and halls which are not rated to the relief of the poor	350	0	0
For the profits in trade of the company	600	0	0

"The company, however, contend that the above criterion is not the proper one, but that they should be rated upon the actual productive value of the works, &c., the amount of which should be ascertained by a calculation of the company's total receipts and expenditure, according to the following statement.

The annual receipts of the company were stated as follows:—

For gas supplied to shops and private buildings	£3301	3	6
For gas supplied to colleges and halls not rated to the poor	814	17	4
For public lights	1300	0	0
For coke sold	500	0	0
For tar sold	50	0	0
	£5966	0	10
The expenses for purchase of coals, lime, labour, salaries, ordinary repairs, and poor-rates, and other taxes, were then stated (specifying the respective amounts) at the total sum of	3595	18	10
Leaving a profit balance of	£2370	2	0
From which balance the company deducted,—			
For renovation of buildings and works (£500); bad debts, law expenses, interest on a capital of £3000 employed in the works, and 20 per cent. allowance for profits in trade; in the whole	£1325	0	0
The company also claimed to deduct gross annual receipts for gas supplied to the colleges and halls not rated to the poor	814	17	4
In all	£2139	17	4
Leaving the annual amount of the rateable property of the company	230	4	8

"Personal estate or the profits of trade are not assessed to the poor-rate in any parish within the town of Cambridge.

"The questions for the opinion of the court were,

1. Whether the principle upon which the assessment has been made, or that contended for by the company, be the right?

2. Whether, supposing the principle adopted by the parish to be upheld, the company may make any and which of the deductions claimed from the sum of £2400?

3. Whether, if the company's principle be adopted, they are entitled to all or any of the deductions which they claim to make from their gross receipts, beyond their ordinary expenses?

4. The total rateable value being ascertained, upon what principle ought it to be distributed amongst the several parishes in and through which the mains and pipes are laid, after deducting £150 for the value of the buildings and works in St. Andrew the Less?

The order of sessions was to be confirmed, or the rate to be adjusted, according to the opinion of this court upon the above questions. The case was argued in last Hiliary Term (Jan. 20, 1838).

"Lord Denman, C.J., in this term (April 25th) delivered the judgment of the court.

"*Judgment.*

"This was an appeal against a rate made for the relief of the poor of the parish of St. Mary the Great, in the town of Cambridge. The sessions confirmed the rate, subject to the opinion of this court upon a case stating that the said company, by virtue of an act of Parliament, containing the usual powers, had erected a gasometer, and other apparatus, in the parish of St. Andrew the Less, in the said town of Cambridge; and had also laid down mains and pipes through the various parishes, and also colleges and halls (which upon the statement we consider to be extra-parochial), including the said parish of St. Mary the Great, and thereby supply the public and private buildings in the said town with gas. The company has been assessed, in the latter parish, in the sum of £70 upon the amount of £2400, which is stated to be what a responsible tenant would give for the whole apparatus for a year, after making some deductions, and disallowing others hereafter to be noticed. Upon the hearing of the appeal, two questions mainly arose:—1. Whether the above principle of ascertaining the sum to be assessed be correct, or whether it ought to have been made upon the total receipts of the company, deducting their expenditure? and 2. Whether due allowance has been made of all proper deductions, supposing the first principle to be correct?

"Now that the general principle adopted by the parish officers, and confirmed by the sessions, as contrasted with that contended for by the appellants, is correct, we consider it to be now too late to doubt. The decisions of Rex *v.* the Trustees of the Duke of Bridgewater, or Rex *v.* Tomlinson, and Rex *v.* Lower Mitton, have, we think, settled the question. The former case is an express authority against the appellants, and the latter in favour of the decision of the sessions, upon this point. We are of opinion, therefore, that the sessions were quite right in the adoption of the general principle, but not equally so in allowing the deductions which ought to be made.

"Three were claimed by the company:—1st. For the renewal of the works, £500; 2ndly. For the value of mains and pipes within the colleges and halls, £350; and 3rdly. For the profits in trade of the company, £600.

"As to the first; the rule laid down in the case of Rex *v.* Lower Mitton, before mentioned, is, we think, in point.

"Amongst other deductions there mentioned, which ought to be made from that rent which is to be the criterion for ascertaining the proper amount of the rate, there is specified a 'further deduction' which ought to be allowed, 'where the subject is of a perishable nature, towards the expense of renewing or reproducing it.' It was observed at the bar that, until the case of Rex *v.* Lower Mitton, this doctrine is not to be found.

"The court, however, in their judgment, for which time was taken, referred to other cases as the foundation of it; and the reasonableness of allowing such a deduction is, we think, obvious; because the estimated rent, at the supposed time of letting, manifestly could not be continued at the same amount, unless the apparatus be maintained in as good a state and condition. And this view of the subject receives confirmation, if it had been requisite, from the recent statute, 6 and 7 Will. IV., c. 96, s. 1, which prescribes the manner in which property shall hereafter be assessed.

"The language there used, in describing one of the deductions to be allowed, is almost in terms the same as that employed by the court in the last-mentioned case.

"The second ground of deduction may be more conveniently considered hereafter.

"The third claim of deduction is for the profits in trade of the company, £600. This claim, it is presumed, has arisen from the fact stated,—that profits in trade are not assessed in any parish in the town of Cambridge; nor are they in this instance.

"The rent which it is found a tenant would give by the year, after certain deductions (viz., £2400), is not the amount of *profits*. Those, necessarily, are something independent of and beyond the rent, upon which the person taking the apparatus must calculate, or nobody would become tenant at all; they are, therefore, perfectly distinct. The rent which a tenant would give for lands after certain deductions, which is the criterion for the due assessment of it, is one outgoing; the expense of cultivation another; and all beyond, whatever that may be, obviously come under the denomination of profits. Since, therefore, *profits* are in their nature wholly distinct from the rent, and are not only not a deduction from it, but the reverse, something beyond and in addition to it, we cannot perceive that this claim rests upon any just principle, and are of opinion that it has been properly disallowed.

"We now come to the fourth question:—Upon what principle the total rateable value, being ascertained, ought to be distributed amongst the parishes in and through which the mains and pipes are laid, after deducting £150 for the value of the buildings and works in the parish of St. Andrew the Less? and it is one of considerable

general importance. The sessions have adopted, as their criterion, the amount of the *receipts for gas supplied in each parish*, and have assigned to the respondent parish the sum of £763. 18s. 8d., being such amount within it; and, if the principle be correct, it is admitted that £70 is the proper assessment upon the company in that parish. In determining this point, it is necessary to consider in *respect of what* the company is rateable according to the decisions; and from the case of Rex *v.* the Corporation of Bath, and various other authorities in conformity thereto, including Rex *v.* the Brighton Gas Light Company, and the still later case of Rex *v.* the Trustees of the Duke of Bridgewater, and many others which might be cited, it appears that they are rateable, as occupiers of land, for *the improved value of the land*, from the gas pipes being laid in it. This, therefore, being, as we think it is, the acknowledged principle, it seems to follow that the criterion before mentioned, which has been adopted by the sessions, cannot be the true one. Suppose (adopting their own rule) the value of the whole works to be £2400 per annum, minus certain deductions, and the quantity of apparatus in the soil of each of the several parishes to be equal, but the sale of gas and the receipts for it to be confined to one, the cases of Rex *v.* the Corporation of Bath, before referred to, and Rex *v.* the New River Company, and Rex *v.* Foleshill, are express authorities to show that a rate upon the company in that particular parish where all the profits are received could not be sustained.

"The New River Company was rated, in the parish of Little Amwell, at the sum of £300, the value of the land, independent of the water, being £5 only; and this court held the rate to be proper, though it was expressly stated that no part of the profits accrued in the parish of Little Amwell, nor, indeed, until the distribution of water in London. Since, therefore, in the present case, the land occupied by the apparatus in each parish through which it passes contributes to the whole value to let, it follows that the company must be rated in respect of its occupation in each parish; and if so, we are aware of no rule which can be laid down as to the amount, except that it must be in proportion to the quantity of apparatus situate in each parish. It is true that in the case of a canal, where the tolls varied in different parts of the line, it was decided that a rate could not be made upon the company in each parish according to the length of the canal in it, and for that reason, Rex *v.* Kingswinford; but in a case very recently before this court, where the tolls were the same throughout the whole line, it was held that the proportion to be paid by the company, in any given parish along the line, must be ascertained by a mileage calculation, Rex *v.* Woking; and as it is impossible to suppose any superiority in one part over another, the same principle, we think, should be applied in the present instance, and that the assessment upon the amount of profits received in the respondent parish was wrong.

"It remains only to consider whether the deduction of £350, being the annual value of that part of the apparatus which lies within the colleges and halls, ought to be made; and we purposely reserved the consideration of this point to the last, because it is connected with the principle which regulated our answer to the last question.

"For inasmuch as the rate is imposed upon land used for the apparatus, and as none can be imposed upon that part which lies in those extra-parochial places, the amount which would otherwise have arisen therefrom (the aforesaid sum of £350) must, we think, be deducted.

"Upon the whole, therefore, in those particulars as to which the sums are agreed upon, the amendment of the rate will be of course; but, as we have no materials for ascertaining the proportion between the parishes, it must (as according to the statement it was intended) in that respect be adjusted.

"Rate to be amended accordingly."

This judgment settles—

1st. That the rateable value is what a tenant will give, which, of course, excludes the tenant's profits.

2nd. That such rents cannot be apportioned among the parishes according to the *receipts* for gas in each parish as adopted by the sessions, but spread over and divided between the apparatus used, according to the *quantity* in each parish.

3rd. That the company must be rated in respect of its occupation in each parish.

4th. That the company must not be rated in respect of its occupation of any apparatus situated on property which is extra-parochial.

5th. That a deduction must be made from the net rent for renewal and reproduction of the works and mains sufficient to maintain them in such a state of repair as will at all times command the rent paid by the tenant.

A rather ambiguous expression used in this judgment has, however, given rise to much subsequent litigation; and the question raised by it still remains in a very equivocal position. It was held that the total rents must be spread over and divided "in proportion to the *quantity* of apparatus situate in each parish." The term "quantity" so used may be interpreted to mean either length, or breadth, or area, or contents, or weight; but in which sense the term was intended to be used still remains undecided, and must be so till some other case arises in which the Court of Queen's Bench can have an opportunity of explaining itself.

The parties representing the Cambridge Gas Company committed, however, a grievious error in admitting that the works could be let to a tenant for £2400 a year, when the whole produce of the property amounted to only £2370, to earn which a floating capital of £3000 was employed, together with a certain amount of skill and talent, for which no compensation was provided, and without which the property would have been unproductive. It was, however, an absurdity to attempt to make these the subject of a claim for a diminished assessment after having admitted that £2400 could be obtained from a tenant, who must, of course, expect to reap some profit for his skill and capital after the payment of the rent.

The most recent important case bearing on the question is that of the East London Water Works, known as the *Queen* v. *the Inhabitants of Mile-end Old Town*, in which the same principles are affirmed, but the uncertainty of the proper manner of apportioning the whole rent amongst the different parishes is rather increased by it than diminished. Lord Denman says, in delivering judgment:—

"In this case the rateable subject being the apparatus for the supply of water, situate in twenty-one parochial districts, and the rateable value (that is £30,000) being the residue of the gross receipts, after making all the deductions to which the company are entitled, have been correctly ascertained by the award. The principle for dividing that sum among those districts is the matter to be decided. The company contend that the division should be according to the amount of fixed capital in each district; but the rule of law laid down by act of Parliament for ascertaining the rateable value of any subject refers to an estimate of the *rent* it should yield. The outlay of capital might furnish no such criterion, since it may have been injudiciously expended; and what was costly may have become worthless by subsequent changes. As our opinion is against the company, upon the objection relied on in argument on their behalf, it follows that the rate must be affirmed. But as the award suggests different methods of apportioning the rateable value, and so arriving at the same rate, it would be convenient if we also stated our views of those methods for applying the above rule of law to such rateable subjects as the present.

"The first step in apportioning has been in effect to divide the whole apparatus constituting the rateable subject into two portions, of which one is directly productive of rateable value, being the service pipes which deliver the water to the consumer; the other indirectly conducing to such productions, being the rest of the works bringing the water to the service pipes. The second portion has been first rated in the ordinary way, by valuing the land with the buildings and fixtures upon it, and the amount of rate so ascertained has been deducted from the sum of the rateable value, and distributed to the districts in which the parts of this portion are situate. An analogous course appears to have been adopted for railways, in Regina *v.* the London and South Western Railway Company (1 Q. B. R., 558); and Regina *v.* the Grand Junction Railway Company (4 Q. B. R., 18); and for gas companies, in Regina *v.* the Cambridge Gas Light Company (8 A. and E., 73). Also the spring, which indirectly conduced to the ultimate profit by water-rate, was held rateable in the parish where it was situate, in Rex *v.* the New River Company (1 M. and S., 503), the quantum of such rate being left for the sessions. As this course was acquiesced in by both parties in the latest three cases, we may presume that it can be applied without practical difficulty, and we see no objection to it.

"The remaining step has been to apportion the residue of the rateable value among the districts in which the directly productive portion of the works is situate, in the ratio either of the net profits or of the gross receipts, or of the quantity of the mains and pipes, and of the land occupied by them in each district. Each ratio in the present case gives the same result. If they differed it would be necessary to select between them, and that ratio should be preferred which would best show the rent to be expected if the part of the works situate in the districts were let separately. It is clear that the net profits in each parish would be the best criterion of such rent, and they would, therefore, give the proper ratio. It is also clear that the ratio of the gross receipts or earnings in the several districts to each other will be the same as the ratio of the net profits in those districts to each other, in all cases where the total of expense is taken to be common to the whole apparatus, and is deducted from the total of receipts in the progress of ascertaining a rateable value. For in such case the net profits in each district would be ascertained by distributing the expense among the several districts, and it would be distributed in the ratio of the gross receipts in each; the ratios of the remainders to each would be the same as the ratio of the gross receipts. As any attempt to ascertain the net profits in each district in any other way would lead to minute and inconvenient inquiries in practice, the ratio of the gross receipts should be adopted as being an index of the net profits, when the rateable value is ascertained in the way stated in the case. We think that an apportionment in this sense, according to the gross receipts, is in accordance with the decisions which have apportioned the sum of rateable value from a railway or canal, according to the length of line in each parish. Rex *v.* Kingswinford, Rex *v.* Woking. When the profit arises from transit, the line of the canal or railway is directly productive of profit, and the reservoirs, warehouses, stations, &c., indirectly conduce to such production. Each portion of the line earns an aliquot portion of the profit; and if equal portions of one line, carrying at *one* rate, could be conceived to be let separately, no one portion would be let at a higher rate than another, and an apportionment of a sum of rateable value according to the length of line in each parish is according to the rent to be expected for that part of the line. In the case of water companies, when the profit arises from the delivery of the water at a given place, the previous transit being immaterial to the consumer, the service pipes immediately produce the profit, and the agency by which the water reaches those pipes indirectly conduces to such production. If the service pipes in each parish could be let separately, the water being assumed to be sold at the same price throughout, the criterion of the rent would be found in the gross receipts, which would depend on the number and diameter and level of the service pipes in each parish; and an apportionment according to the gross receipts in each district would be according to the rent to be expected from the part of the

rateable subject situate in such districts. This apportionment is not at variance with the grounds of the judgment in Regina *v.* the Cambridge Gas Light Company. There the court decided that the parishes in which the profits are received are not entitled to all the amount produced by the rate, but that the parishes in which parts of the apparatus indirectly conducing to produce profit are situate are entitled to a proportion. The court also declared that the principle upon which the sum of rateable value from the rates of all the parishes should be apportioned is the same as that which has been applied to canals. By the method adopted in this case, the rateability of the portion of the apparatus indirectly conducing to produce profit is provided for, and the residue of the sum of rateable value is apportioned to those parts of the apparatus directly producing profit, in analogy to the mileage proportion for canals and railways. We have thus endeavoured to show that the rule for ascertaining the value for separate rating ought to be applied, as far as practicable, to apportioning among separate districts a sum of rateable value arising partly in each."

(*To be continued.*)

Register of New Patents.

Florentine Joseph De Cavaillon, Paris, chemist, for "*certain improvements in obtaining carbonated (query carburetted?) hydrogen gas and in applying the products resulting therefrom to various useful purposes.*" Patent dated Aug. 1, 1849.

The patentee remarks that the ordinary carburetted hydrogen gas has hitherto been manufactured from coal alone; but that he proposes to mix with the coal, in the proportion of 50 per cent., bones, suet, oleaginous seeds, spent bark, and sawdust which has been used in the purification of oils, or any fatty or oily waste. These substances are moistened with molasses or empyreumatic oil, and mixed with the coal; after which the whole is shovelled into ordinary gas retorts, and distilled in the usual way.

The resulting products are said to be—

1. Carburetted hydrogen gas, of a highly illuminating power.
2. Animal charcoal.
3. Animal and vegetable charcoal, in powder, which may be applied to the preparation of manure.
4. Empyreumatic oil.
5. Rich ammoniacal liquors.

In order to economize the lime employed in the purification of gas, it is proposed to employ a purifying powder, composed one half of any of the natural or artificial sulphates of lime (by preference, plaster which has been used in building), animal charcoal, vegetable charcoal, coke, river or sea sand, spent bark, sawdust, peat or turf, sulphate and oxide of lead, all reduced to powder and wetted with dilute sulphuric acid, or acidulated water of 6° to 7° Beaumé. The gas to be purified is made to pass through perforated metal plates, or wire-gauze shelves, upon which is laid moss to prevent the apertures being clogged by the refining powder which is laid thereon. The lime is laid above the powder. The quantity of lime employed is one-third, and that of the refining powder two-thirds; which last is composed of purifying substances, such as the sulphates of lime, inert substances rendered purifying, such as sawdust saturated with sulphuric acid, and inert substances, such as powdered coke. When the materials are charged with too much ammonia or sulphuretted hydrogen (which can be ascertained by causing the gas to come in contact with turmeric test paper, which will become red, and paper saturated with acetate of lead, which will be turned black), they are to be replaced by a fresh supply of refining powder and lime.

No claims are made in this specification.

David Owen Edwards, Sydney-place, Brompton, surgeon, for "*improvements in the application of gas for producing and radiating heat.*" Patent dated Sept. 20, 1849.

The chief feature of this invention is the employment of gas burners, constructed of pipeclay, or other suitable argillaceous material, in the form of bulbs, which are perforated with numerous holes. The supply of gas to these burners is regulated in such manner that air may enter the lower holes, and mix with it, so that, after the bulb has become heated, it will be covered with a thin yellow flame. Mr. Edwards describes several constructions of stoves, composed of earthenware, or earthenware and metal combined, for heating and cooking, in which these bulb gas burners are employed for the production and radiation of heat.

Claims.—1. The construction of gas burners of pipeclay, or other suitable argillaceous material, perforated with holes, and adapted to the production and radiation of heat by the application of gas.

2. The construction of stoves of earthenware, or other argillaceous material, with a double casing for the passage of air in combination with gas burners constructed as before described.

3. The construction of cooking stoves or ovens of earthenware, or other argillaceous material, in combination with gas burners constructed as before described.

William Boggett, of St. Martin's-lane, manufacturer, for "*improvements in heating and evaporating fluids.*" Patent dated Sept. 27, 1849.

Carburetted hydrogen gas is proposed to be employed in these stoves as the source of heat. A cylinder forms the body of the stove, and is closed in at top and bottom by plates. There are a series of conical air tubes, of earthenware or metal, which are fixed, with their broad ends uppermost, within the cylinder, being closely fitted into apertures made for them in the top and bottom plates, so that they shall have no communication with the surrounding spaces. Rings of gas burners, which may be supplied from any convenient source, are pierced with holes on those sides only which face the conical air tubes, so that the streams of flame may impinge directly upon the tubes. Apertures are provided for the supply of air to the gas burners; and a flue carries off into the chimney the smoke and vapour which accumulate in the spaces. There is a chamber at the top of the stove for the reception of the warmed air which ascends the conical tubes; and a perforated regulator, by which the quantity of heated air admitted into the chamber or apartment where the stove is placed can be regulated at pleasure. It will be seen that, from the manner in which the parts of this stove are arranged, no intermixture of the products of combustion with the air to be warmed can take place, and that one of the chief objections to the use of stoves of this description is thus completely removed. Another form of stove is given, in which coal or coke is intended to be employed as the source of heat (but to which gas may be also applied).

A gas stove differing in its construction from those before described consists of an outer cylinder of iron, having a circular hood of fire-clay, which rests on the bottom of the case, and contains a ring of burners, these being vertical tubes of earthenware, open at both ends, by which the hood communicates with a smoke-box at the top of the stove. Apertures in the bottom plate of the outer case admit streams of atmospheric air into the hood, from which they ascend in a heated state (less the portion required for the combustion of the gas) through earthenware pipes, imparting a degree of heat thereto. A pipe carries off the smoke and vapour which collect in the hood into the chimney; and apertures in the outer case admit atmospheric air into the space between the outer case and the interior hot-air tubes, where they become warmed by contact with these tubes, without acquiring any of the empyreumatic odour which belongs to air heated by direct contact with the flame or with metallic surfaces, and from which they are distributed to the surrounding apartment by a perforated regulator, as in the other gas stoves before described.

Several other stoves are described, in all of which the air to be heated, instead of being taken from the apartment in which the stove is placed, may be conducted from the open air on the outside by means of a pipe or pipes suitably laid and connected.

The nature of the remaining improvements specified by Mr. Boggett will be gathered from the claims, which are as follows:—

Claims.—6. The construction of ovens with the top and bottom sides composed of corrugated or fluted plates, containing in the corrugations or flutes thereof pipes for the circulation of steam or hot air, and also a modification thereof.

7. The employment for heating and evaporating purposes of cells or vessels permanently filled with heated water or other fluid, or metallic alloys in a fluent state, in the manner described.

8. The employment in steam boilers of flues, having short cross tubes open at both ends.

9. The construction of the flues or tubes of steam boilers and other heating apparatuses with an internal lining of fire clay, or with internal division pieces of fire clay.

10. A peculiar construction of steam or hot-water tubes.

11. Peculiar modes of heating of steam boilers by gas.

12. The employment for heating and evaporating purposes of a combination of hydrogen, or carburetted hydrogen gas, in a cold or heated state, with heated atmospheric air, or with heated atmospheric air and lime; also the combination of heated oxygen gas with hydrogen gas, either cold or heated.

Miscellaneous News.

The Electric Light.—We have received the specification of Messrs. Staite and Petrie, for their improvements in electric light, which is of great length, and inscribed in the usual verbose style of all Chancery documents. We cannot, of course, inflict on our readers the task of wading through this sea of words, to discover the nature of the several claims, of which there are fifteen; but shall endeavour to render the plans understood by a simple description, as a summary of the whole:—1. The invention consists of improved hydro-barometers, the use of which is to place them in the individual battery cells, so that the liquid supplied to each cell shall drop first into the instrument, and thence into the liquid in the cell, whereby the relative specific gravities of the liquids can be discerned by inspection, and it can then be known whether any cell is becoming more exhausted than the others, or whether any of them are receiving an undue share of liquid.—2. The invention consists of a flexible enclosed capillary syphon, to be used with galvanic batteries; it may be made with lamp wick, woollen material, asbestos, hair, wire, &c., enclosed in a tube of vulcanized caoutchouc, which, being waterproof, protects the material from injury from water, or most dilute acids. This capillary syphon is used to draw the liquids slowly from the upper or lower part of a cell, and another similar syphon can be used to replenish the same. The peculiarity of this syphon is, that it can take liquid from any depth the lower orifice is placed in, without taking any from above, as ordinary capillary syphons do, nor does it wet the sides of the vessel over which it passes.—3. For the protection of galvanic apparatus, they are sulphurized by a process which is applicable to most metallic articles, and even to wood, and some other materials. The article is heated to a degree to freely melt the sulphur; a roll of sulphur is then rubbed slowly over its surface, until the whole is dripping wet with melted sulphur. If it be desired to give a thin coat only, the sulphur is wiped off with tow, or scraped off with an edge of wood; but, if a thick coat is required, the article is slowly turned about in all directions, until the sulphur has begun to solidify upon it. When cold, the sulphur will form a hard and compact coating, not so easily chipped off as ordinary cements. This process is exceedingly useful to protect the exterior of cast-iron batteries from chemical action, and for wood, or iron vessels or channels, for holding or conveying nitric acid.—4. The invention has relation to the change of the specific gravity of the solution, which becomes heavier by the action of the battery to effect the removal of the exhausted or heavy part to give a fresh supply in its place. By this improvement there is no necessity for a great bulk of undiluted fluid,

the cells may be very compact, and a greater number of cells in a separate trough.—5. The invention consists of a negative-supply apparatus by gravitation, used for supplying and withdrawing from batteries such liquids as become specifically lighter by working, especially that class of liquids which may be renovated by dissolving in them a fresh supply of their solid material, such as sulphate of copper.—6. Treats of a self-clearing capillary tube syphon, made of glass, for transferring liquids to or from the cells; and, as an air-bubble at times enters such ordinary syphons, and thereby causes an interruption to their regular action, these are made trumpet-mouthed, gradually widening until the lower end is one-third or one-fourth of an inch internal diameter.—7. An improved method of using saline solutions. The patentees prefer hydrochlorite of ammonia, or nitrate of potash, next the positive plate, which should be of zinc, and sulphate of copper and copper for the negative solution and plate; a diaphragm is placed between, to separate the liquids, of a material which will allow of being soaked. A two-fluid battery of this kind is less proportionally reduced in power than a single-fluid one, which is not generally known, and, by the closer approximation of the positive and negative elements, greater power is obtained.—8. The invention consists of an improved concentric cell, for the above-named closer approximation of the elements.—9. An improved arrangement of a series of cells.—10. The invention consists of certain improvements in the treatment of iridium, and the manufacture of articles in iridium, the first being a novel method of fusing the metal, by laying it on a bed of its own powder, and passing a powerful current of galvanism through it; the fused iridium is then worked up into a cylindrical form, two inches long, one-fifth of an inch diameter, terminating in a blunt point, and forms an electrode, which is fixed in a holder of brass, to which the negative wire and a holder of wood is attached.—11. An improved self-acting Rheostat, called by the patentees an equalizer.—12. A compensating dial balance galvanometer.—13. A deferential galvanometer, the object of which is to show separately both the quantity and intensity of the electric current, without having two separate instruments, and without the necessity of greatly intermitting the current.—14. The employment of a chain and barrel, in place of a rack and pinion, for supporting and imparting motion to the electrode shaft in certain electric lamps, and thus keeping them at the required distance from each other, as they wear away.—15. An improved electric-lamp movement, having relation more particularly to such as have one carbon electrode pushed up to the other, as one wears away.

On the Purification of Coal Gas.—A correspondent of the *Mining Journal* makes the following remarks on this subject:—"Being an old and constant reader of your valuable journal, may I ask you to find room in your next publication for the following few *facts*, if you should consider them, in this age of "cheap gas," of sufficient importance? Being about to make some extensive alterations in our arrangements for purifying coal gas, and finding considerable difficulty in disposing of the lime after we had done with it in the purifiers, I determined upon trying some other material than that which we had been in the habit of using; I, therefore, made use of the sulphate of iron; but, being afraid of infringing Mr. Johnson's patent for the purification of coal gas by the agency of metallic salts in a *dry state*, the idea suggested itself of first *dissolving the salt*, which I did in boiling water, and then took it up again by using an absorbent. I used "sawdust," and found it a very convenient vehicle; but, being at the time very short of room in the purifiers, I added a quantity of finely-sieved lime in a dry state to the sawdust, after it had absorbed the solution of the sulphate of iron, and then mixed the whole intimately together, and placed the mixture in the purifier upon the same sieves as we had previously used for lime. The gas in its impure state was then allowed to percolate through the mixture, when, by applying the acetate-of-lead test, I found that the sulphuretted hydrogen was arrested; but I could discover throughout the whole experiment traces of ammonia. After 1500 cubic feet of gas had passed through, I found that the mixture had exhausted its purifying influence, and had it removed from the purifier to an exposed but dry situation; it had then a very *black* appearance; I suppose that sulphuret of iron had been formed. After it had lain exposed to the atmosphere for some time, a very curious change took place: the mixture had lost its *black* colour, and had assumed a brownish cast; indeed, I feel fully persuaded that the mixture had been converted, by the influence of the atmosphere, from a sulphuret of iron to an oxide. I then moistened it with common water, and placed it in the purifier as before, when no less than 2400 cubit feet of gas were purified before any trace of sulphuretted hydrogen was detected. The mixture was again removed from the purifier, and exposed as before, when apparently the same change, both in colour and constitution, took place. For a third time was it placed, after being moistened with common water, in the purifier, and in this experiment no less than 3050 cubic feet were purified, or cent. per cent. upon the first trial; thus have I been making use of the same materials over and over again, the same changes continually taking place in the mixture. When in the purifier, a black sulphuret of iron is formed; place it in the atmosphere, and it becomes a red or reddish oxide of iron, capable of being made use of again for the same purpose. Now, sir, if my theory of the matter be the true one, I think the result of the experiments most important. But whether true or false, as regards my theory, or *rationale*, the practicability of purifying coal gas by the agency of the sulphate of iron, first being dissolved in water, then taken up again by some absorbent, say "sawdust," and afterwards mixed with a portion of lime, previous to being placed in the purifier, and using the same over and over again, not merely twice or thrice, but an indefinite number of times, is established—it is a fact, and one fact is worth any quantity of theory. I am still going on with the experiments; I make use of 112lb. of the sulphate of iron, one bushel (or about 40lb.) of finely-sieved lime, and about five bushels of common sawdust." The same correspondent in a subsequent communication further observes, "My communication of last week, under the above head, appears to have a stimulating effect upon the 'gas world;' indeed, so important do I consider the subject, that I am induced to offer a few further remarks. In my last it was stated that the quantity of gas purified by the materials employed increased regularly from 1500 to 3050 feet; I have now to inform you, that the quantity has reached 4200 cubic feet on each trial, which quantity appears at present to be its maximum effect. I have also to suggest a mode of reconverting the sulphuret into an oxide in much shorter time than by mere exposure to the atmosphere. I propose to force air through the materials, whilst in the purifier, by mechanical means—say, by bellows, centrifugal fan, or, as I am now making arrangements for, a steam jet, *à la* Gurney; and I feel fully persuaded that the plan will be a great improvement over the present system. I shall try the experiment to-morrow." [We believe Mr. Laming has a patent for the process above described; and should advise parties who are inclined to adopt it to assure themselves that it is no infringement.]

Coal Formations.—It appears, from the researches of Liebig and other eminent chemists, that when wood and vegetable matter are buried in the earth, and partially or entirely excluded from the air, they decompose slowly, and evolve carbonic acid gas, thus parting with a portion of their original oxygen. By this means they become gradually converted into lignite, or wood-coal, which contains a larger proportion of hydrogen than wood does. A continuance of decomposition changes this lignite into common or bituminous coal, chiefly by the discharge of carburetted hydrogen, or the gas by which we illuminate our streets and houses. According to Bischoff the inflammable gases which are always escaping from mineral coal, and are so often the causes of fatal accidents in mines, always contain carbonic acid, carburetted hydrogen, nitrogen, and olifiant gas. The disengagement of all these gradually transforms ordinary or bituminous coal into anthracite, to which the various names of splint-coal, glanic-coal, culm, &c., have been given.

Improved Manufacture of Peat Charcoal.—Although numerous have been the attempts to produce a charcoal from peat fit for all, even the most delicate, metallurgical purposes, and although several patents have been obtained within the past few years for particular methods of manipulation, success has not yet appeared to have crowned our efforts in this country. While these attempts have been made in vain in England and Ireland during the past ten years, Mr. Vignoles, the well-known railway engineer, during his professional duties on the Continent, discovered that a process for converting peat into charcoal or coke had been most successfully carried out in Germany for some years past. He accordingly availed himself of the opportunity, and, having made himself master of all the details of the process, has taken out a patent for Ireland, from the specification of which we extract the following particulars:—The peat is subjected to a certain high temperature, in such manner as to deprive it of the whole, or the principal portion, of the water which it naturally contains. This heat is then continued under peculiar circumstances until the peat is converted into charcoal or coke. One of the most important properties of the process is, that by the mode adopted of applying the heat the substance is not burned to ashes and wasted. In the first part of the process, the peat or turf, extracted from the bog by any of the usual methods, is dried in pieces of any convenient size, either by exposure to sun and air, or to artificial heat, and afterwards placed in an iron vessel of large capacity, called the "carbonizing vessel." Steam, generated in any form of boiler, with a pressure of from 45 lb. to 60 lb. per square inch or upwards above the atmospheric pressure, is passed through a number of tubes of iron, heated to a bright-red heat, by being placed in a suitable furnace, so that, without losing its pressure, it acquires additional temperature up to 450° or 460° Fahr., or about the melting point of tin or lead. This part of the apparatus is called the "coil," the surface of which should be nicely proportioned to the generating power of the boiler. The steam thus highly heated is permitted to pass into the "carbonizing vessel" containing the partially dried peat, and the effect is rapidly to withdraw any moisture which may remain, in the state of steam, from the peat; the whole of the steam from this vessel is allowed to escape, and may be advantageously used as a motive power, for preparatory desiccation of the turf, or for any other purpose. After this drying process has gone on until the peat or turf has parted with nearly all its moisture, it begins to be charred or carbonized by the high-pressure steam, and in proportion as the dehydration of the peat advances, so does the temperature of the carbonizing vessel increase, until it approaches closely to that of the steam in the coil, which must be sufficiently high for the perfect decarbonization of the peat. The process is continued until the turf is found reduced to a black substance, retaining the forms of nearly the original masses, but now almost a perfect vegetable charcoal or coke.

Fire-Bricks for Furnaces.—The *Morning Chronicle* commissioner, in his letter from Merthyr Tydvil, gives an account of a curious branch of industry carried on there—viz., the making of fire-bricks for lining the furnaces, and, indeed, for all other purposes where a material is required capable of withstanding intense and long-continued heat. There are two substances, found in abundance in the coal and iron districts, which have the property of resisting, in a high degree, the action of fire; the one is termed "fire-clay," a stratum of which is often overlaid by coal—the other is the "farewell rock," a species of stone composed of quartz, blended together by a siliceous cement. Upon this rock repose the whole of the coal and iron-stone "measures." The bricks are used for lining the interior of the blast-furnaces down to "the hearth," or receptacle of the fluid iron, which is always constructed of the stone. Experiments on bricks made of this fire-clay have satisfactorily shown that its capacity of resisting heat is fully equal to that of the better known, and more generally used, fire-bricks of Stourbridge. The manufacture of fire-bricks at these works is exclusively carried on by women, and a more humiliating and ungenial occupation for the sex is hardly to be found through the entire range of our industrial economy.

Share List.

THE PRICES QUOTED ARE THOSE AT WHICH THE LAST SALES HAVE BEEN MADE.

The Companies whose names are printed in italic type are incorporated by Act of Parliament.

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£	**ENGLAND.**	£ s. d	£ s. d	£ s. d
		Aberdare			
		Abergavenny			
		Aberystwith			
		Abingdon			
		Accrington £5500		5 0 0	
		Alcester			
		Alford, Lincolnsh.			
		Alfreton			
		Alnwick			
		Alston Moor			
		Alton			
800	5	Altrincham	5 0 0		
		Amlwch			
		Ampthill			
350	10	Andover	10 0 0	6 0 0	11 0 0
		Appleby			
		Arundel			
		Ashbourn, Derby			
		Ashburton			
		Ashby-de-la-Zouch			
		Ashford, Kent			
		Ashton-under-Line £42,500		13 4 0	
		Atherstone			
		Axminster			
225	20	Aylesbury	20 0 0	5 0 0	20 0 0
		Aylsham, Norfolk			
		Bacup, Yorkshire			
		Bakewell			
		Baldock			
140	25	Banbury	25 0 0		
		Bangor			
500	5	Barking, Essex	4 10 0	5 11 0	5 0 0
250	10	Barnard Castle	10 0 0	5 10 0	10 15 0
		Barnet			
		Barnsley £6000		7 10 0	
100	20	Barnstaple	20 0 0	7 10 0	25 0 0
		Barton			
120	25	Basingstoke	25 0 0	8 0 0	28 0 0
2400	20	*Bath*	16 0 0	10 0 0	25 to 30
		Battle £2000		6 0 0	
56	26½	Bawtry	26 10 0	5 0 0	25 0 0
		Beaumaris			
		Beccles, Bungay, and Lowestoft			
		Bedford			
		Belford			
		Bedale, Yorkshire			
		Belper			
		Beminster			
		Berkhempstead			
700	5½	Berwick-on-Tweed	5 10 0	6 8 0	5 15 0
		Beverley			
		Bewdley			
280	10	Bideford	10 0 0	6 0 0	10 10 0
		Biggleswade			
		Bicester			
		Bilston £25,000			
		Billericay			
		Bingley			
		Birkenhead and Claughton £56553	35 0 0	3 7 6	32 to 34
2400	50	*Birmingham and Staffordshire*	50 0 0	8 0 0	72 to 74
	25	*Ditto*, new shares	7 10 0	8 0 0	11 0 0
704	75	Birmingham	75 0 0	10 0 0	114 to 116
		Bishop's Auckland			
		Bishop's Stortford			
		Blackburn £24,000		10 0 0	
		Blandford			
		Blythe			
		Bodmin			
		Bognor			
		Bolton £49,500		9 0 0	
		Boroughbridge			
		Boston £8000		6 0 0	
200	10	Bourn	10 0 0	5 0 0	
		Brackley			
		Bradford, Wilts.			
		Bradford, Yorksh. £45,000		10 0 0	
		Brampton, Cumb.			
		Brandon, Suffolk			
		Brecon			
		Bridge-end, Glam.			
		Brierly Hill			
2250	20	*Brighton*	20 0 0	5 0 0	14 to 15
1125	20	„ new shares	16 0 0	5 0 0	
		Brighton and Hove £50,276			
4250	20	*Bristol*	20 0 0	10 0 0	37 0 0
1725	25	*Bristol and Clifton*	25 0 0	6 0 0	25 0 0
		Brixham			
		Braintree			
750	50	*Brentford*	50 0 0	6 0 0	44 to 46
800	25	„ new shares	11 0 0	6 0 0	11 0 0
		Brentwood			
		Bridgnorth			
		Bridgwater £6000		5 0 0	
400	10	Bridlington	10 0 0		8 0 0
		Bridport			
		Brigg			
		Broadstairs			
100	50	Bromley, Kent	50 0 0	6 0 0	52 10 0
		Bromsgrove			
120	10	Bruton	10 0 0	4 0 0	8 0 0
100	25	Buckingham	25 0 0	5 0 0	25 0 0
		Bungay (see Beccles)			
		Burford			
		Burlington			
		Burnley £19,946			
		Burslem			
		Burton-on-Trent			
		Bury St. Edmund's			
		Bury, Lanc. £6570			
		Buxton			
		Callington			
		Calne, Wilts			
		Camborne			
		Cambridge £32,000		7 0 0	
240	50	*Canterbury* Gas and Water	50 0 0	6 0 0	57 to 58
240	25	*Ditto*, second issue	25 0 0	6 0 0	25 0 0
		Cardiff £10,500		7 10 0	
		Carlisle £9000		8 0 0	
		Carmarthen			
		Carnarvon			
		Chapel on the Frith			
		Chard			
		Chatham (see Rochester)			
		Chatteris			
		Cheadle			
		Chelmsford			
		Cheltenham £17,242		8 10 0	
		Chepstow			
		Chertsey			
		Chesham, Bucks			
		Chester			
		Chester-le-street			
		Chesterfield £12,023			
240	25	Chichester	25 0 0	6 0 0	30 0 0
		Chippenham			
		Chipping Norton			
		Chirk			
		Chorley			
		Cirencester			
		Clifton (*Bristol and Clifton*)			
		Cleckheaton, York.			
		Clitheroe			
		Cockermouth			
		Colchester			
		Colne, Lancashire			
		Coleford, Gloucest.			
		Coggeshall			
		Congleton £5000		7 10 0	
		Cowbridge			
800	25	*Coventry*	25 0 0	5 0 0	20 0 0
		Cowes			
		Crewkerne			
		Croydon			
		Cranbrook £1900		5 0 0	
		Crediton			
		Crewe, Cheshire			
		Darlaston			
		Darlington			
250	20	Dartford	20 0 0	7 10 0	27 0 0
		Dartmouth			
125	20	Daventry	20 0 0	6 0 0	24 8 0
		Dawley, Shrop.			
		Dawlish			
500	6	Denbigh	6 0 0	5 0 0	6 0 0
820	10	Deptford, Bermondsey, and Rotherhithe	10 0 0	5 0 0	4 10 0
325	50	*Derby*	50 0 0	10 0 0	
90	20	Dereham (East)	20 0 0	4 10 0	
1000	5	*Dewsbury*	5 0 0	7 10 0	8 12 6
		Devizes			
4000	5	*Devonport*	5 0 0	6 0 0	5 14 0
		Diss			
		Doncaster			
280	25	Dorchester	25 0 0	5 0 0	25 0 0
120	25	Dorking	20 10 0	5 0 0	21 10 0
		Douglas, Isle of M.			
209	56½	*Dover*	56 10 0	4 8 6	50 0 0
		Downham			
		Driffield			
		Droitwich			
600	20	*Dudley*	20 0 0	4 0 0	15½ to 16½
		Dunmow			
		Dunstable			
		Durham			
276	9	Dursley, Gloster	9 0 0	5 10 0	8 0 0
		Elland			
		Ellesmere			
300	19	Epsom	19 0 0		
		Evesham			
		Exeter £40,000		8 0 0	
		Exmouth			
		Eye, Suffolk			
		Fakenham			
		Falmouth			
		Fareham			
120	25	Farnham	25 0 0	10 0 0	42 0 0
		Farringdon			
		Faversham			
		Fleetwood			
		Folkestone			
		Framlingham			
		Frome			
		Garstang			
		Gillingham, Dorset			
		Glastonbury			
		Glossop £6000		7 0 0	
		Gloucester £24,600		7 10 0	
		Gomersal			
		Godalming			
		Gosport			
		Grantham			
		Gravesend			
1000	10	*Great Grimsby*	6 10 0	8 0 0	8 5 0
		Guildford			
		Guisborough			
		Hadleigh			
		Hales Owen			
300	6	Halesworth	6 0 0	7 10 0	5 10 0
		Halifax £15,000		8 0 0	
		Halstead			
		Harleston			
		Harrogate £10,000			
		Hartlepool £7835		7 0 0	
		Haslingden, Lanash			
330	50	Hastings and St. Leonard's	50 0 0	6 0 0	60 0 0
		Haverfordwest			
		Haverhill			
		Haworth, Yorks.			
		Helstone			
		Hemel Hempstead			
300	10	Henley-on-Thams.	10 0 0		
		Hereford £5300		4 0 0	
		Herne Bay			
270	10	Hexham	10 0 0	7 0 0	12 0 0
		Heywood £10,000		7 10 0	
230	10	Hinckley	10 0 0	5 0 0	7 0 0
		Hindley, Lancash.			
		Hitchen			
		Hythe			
		Hoddesden			
		Holbeach			
		Holmfirth £8325		6 0 0	
		Holyhead			
		Holywell (see British Provincial)			
		Honiton			
		Hornecastle			
10		Houghton-le-Spg.	10 0 0	8 0 0	
		Horsham			
		Howden			
		Hull, Sculcoats (see British Provin.)			
		Hull, £11,712, 10s.		8 0 0	
		Hungerford			
		Huddersfield			
520	5	High Wycombe	5 0 0		5 0 0
		Hyde, Cheshire			
		Ilminster			
		Ilford			
		Ilfracombe			
		Ironbridge			
1400	10	*Ipswich*	10 0 0	8 0 0	15 0 0
1400	10	„ new shares	5 0 0	8 0 0	
800	25	*Isle of Thanet* (Ramsgate&Mar.)	20 0 0	5 0 0	20 to 21
		Kendal £7600		7 10 0	
		Kenilworth			
		Keswick			
100	25	Kettering	25 0 0	5 0 0	25 0 0
		Kiddermins. £8000		5 0 0	
		King's Langley			
		Kington, Hereford			
		Kirkby Lonsdale			
		Knutsford			
		Llanelly			
		Llandovery			
		Leamington Priors £20,000		6 0 0	
		Ledbury			
		Leeds Old Comp. old stk., £60,300		10 0 0	
		new „ £11,527		6 0 0	
		Leeds New Comp.			
		Leek			
		Leicester		7 0 0	
		Leigh			
125	20	Leighton Buzzard	20 0 0	5 0 0	
		Leominster			
		Leyburn, Yorksh.			
		Liskeard			
330	25	Lewes	25 0 0	5 0 0	23 0 0
		Lincoln £8000		10 0 0	
		Leyland, Lancash.			
		Littlehampton			
250	20	Lichfield	20 0 0	7 10 0	27 10 0
		Liverpool United	100 0 0	9 0 0	174 to 176
		„ ½ sh.	25 0 0	9 0 0	43¼ to 43½
		Langport			
		London Comps.—			
5000	40	*British*	18 0 0	5 11 1	13 to 14
		„ debentures		4 0 0	
5000	20	„ Prov.—(Ayr, Clonmel, Gloucester, Holywell, Hull, Norwich, Stoke, Trowbridg)	20 0 0	7 0 0	20 to 21
	20	„ Prov., new	3 0 0	7 0 0	3 to 5
	25	*Commercial*	25 0 0	5 10 0	25 to 26
	25	„ new shres	10 0 0	5 10 0	½ dis.
	25	„	2 10 0	5 10 0	¼ dis.
12,000	50	*Chartered*	50 0 0	6 0 0	45 to 47
6000	50	„ new shares	10 0 0	6 0 0	9 to 9½
1000	100	*City of London*	100 0 0	10 0 0	
1000	100	„ new shares	75 0 0	10 0 0	
4000	50	*Equitable*	50 0 0	4 10 0	25 to 28
10,000	20	European— (Amiens, Boulogne, Caen, Havre, Nantes, and Rouen)	20 0 0	5 0 0	9 to 10
8000	50	*Impl. Continental*—(Amsterdam, Aix-la-Chapelle Antwerp, Berlin, Bordeaux, Brussels, Cologne, Frankft., Ghent, Haarlem Hanover, Lille,			

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
		Marseilles, Rotterdam, Toulouse, Vienna)	42 0 0		40 to 45
7000	50	„ new shares	38 0 0		45 to 50
	50	„ third issue	42 10 0		40 to 45
10,000	50	*Imperial*	50 0 0	6 0 0	68 to 69
		„ debentures			
4000	40	*Independent*	40 0 0	6 0 0	58 to 60
8000	25	*London*	25 0 0		9 to 12
6000	25	„ preference	25 0 0	6 0 0	20 to 25
9000	50	*Phœnix*	47 0 0	4 10 0	27 to 30
1000	100	*Ratcliff*	90 0 0	5 0 0	73 to 75
4000	25	*South Metrop.*	25 0 0	6 0 0	24 to 26
9000	50	United General— (Cork, Dublin, Limerick)	50 0 0	2 10 0	14 to 16
12,500	20	Western	10 0 0		
		Lostwithiel			
		Loughborough			
240	25	*Louth*	25 0 0	6 0 0	26 10 0
		Lowestoft (see Beccles)			
611	5	Ludlow Union	5 0 0	6 0 0	5 0 0
		Luton			
		Lyme Regis			
		Lymington			
		Malmesbury			
		Macclesfield £20,000		4 13 5	
		Maidenhead			
250	50	Maidstone	50 0 0	10 0 0	100 0 0
		Maldon			
		Marlborough			
		Malton (New)			
		Malvern			
		Manningtree			
		Mansfield £5000		10 0 0	
		March			
		Margate (see I. of T.			
		Market Deeping			
132	25	Market Harboro'	25 0 0	6 0 0	30 0 0
		Market Raisin			
		Market Weighton			
		Marlow			
370	10	Maryport	10 0 0	6 0 0	12 0 0
		Melksham			
		Melton Mowbray			
		Merthyr Tydvil			
		Mere			
		Middleton £5000			
		Midsummer Norton			
		Middlesboro'			
		Mildenhall			
		Mitcham			
		Mold			
700	10	Monmouth Gas and Water	10 0 0	5 0 0	
		Monk Wearmouth			
		Moreton in Marsh			
		Morley			
		Nantwich			
		Neath			
		Needham Market			
		Newark £5000		10 0 0	
250	10	Newbury	20 0 0	5 0 0	20 0 0
13,000	5	Newcastle & Gateshead Union	5 0 0	10 0 0	6 12 6
		Newcastle-under-Lyne £5000		5 0 0	
600	5	Newmarket	5 0 0	6 0 0	5 0 0
		Newnham, Gloucestershire			
		New Mills & Hayfield £2115			
		Newport, Mon.			
320	50	*Newport, Isle of W.*	38 0 0	4 0 0	19 to 20
		Newport Pagnell			
		Newport, Salop			
		Newton Abbot			
		Newton, Lanc.			
		Northallerton			
		North Walsham			
		Northampton			
		Northwich			
		Norwich (see British Provincial)			
900	50	*Nottingham*	50 0 0	10 0 0	
900	50	New shares		10 0 0	
		Nuneaton			
		Oakham			
		Oakhampton			
200	10	Odiham, Hants	10 0 0	3 10 0	10 0 0
		Oldham			
		Ongar			
		Ormskirk			
		Otley, Yorkshire			
		Oundle			
		Oxford £18,000		9 10 0	
		Over Darwen £8000		5 0 0	
		Padstow			
		Pately Bridge, Yrk.			
250	20	Penrith	15 0 0	6 10 0	21 0 0
		Penryn			
		Penzance			
		Pershore			
200	10	Petworth	10 0 0	9 10 0	12 0 0
		Pickering			
3000	10	*Plymouth & Stonehouse*	10 0 0	6 0 0	11 0 0
		Pocklington			
		Pontefract			
		Pontypridd			
400	10	Poole	10 0 0	5 0 0	10 0 0
		Port Madoc			
600	50	*Portsea Island*	53 0 0	5 0 0	45 to 47
400	10	Prescott	9 0 0	4 13 4	7 0 0
		Preston £52,500		10 0 0	
		Pwllheli			
		Pontypool			
		Pudsey			
		Radcliff and Pilkington £9000		4 12 10	
		Ramsay, I. of Man			
		Ramsgate (see Isle of Thanet)			
		Ravenglass			
1000	10	*Reading*	10 0 0	3 0 0	7 0 0
500	20	Reading Union	20 0 0	6 0 0	17 0 0
		Redditch			
		Redruth			
		Reigate			
		Retford (East)			
		Richmond, Surrey			
		Ripon			
		Rochester and Chatham £14,000		6 0 0	
		Rochford			
		Rockingham			
		Romford			
		Ross			
		Rotherham £4000		10 0 0	
		Royston			
		Ruabon			
		Rugby			
		Rugeley			
		Ruthin			
		Runcorn			
500	10	Ryde	10 0 0	6 0 0	12 0 0
		Rye			
		Romsey			
		Saddleworth			
225	20	Saffron Walden	20 0 0	3 15 0	19 0 0
		St. Austel			
		St. Colomb			
		St. Helen's £7200		5 0 0	
		St. Ives, Hunting.			
		St. Ives, Cornwall			
		St. Neot's			
		Salisbury			
		Sandbach			
		Saxmundham			
		Scarborough			
		Seaham			
		Selby			
		Settle			
290	10	Sevenoaks	10 0 0	5 0 0	10 0 0
		Shaftesbury			
5400	25	*Sheffield United*	24 0 0	8 6 4	32 0 0
		Shelton, Potteries (see Brit. Prov.)			
		Shepton Mallet			
		Sherborne			
2914	5	Shields, North (Tynemouth)	5 0 0	3 0 0	5 0 0
		Shields (South)			
		Shiffnal, Salop			
		Shipley			
		Shipston-on-Stour			
		Shoreham			
		Shrewsbury £10,000		7 0 0	
400	10	Skipton	10 0 0	4 0 0	11 0 0
		Sleaford			
		Slough			
		Snaith			
		Soham			
		Southwold			
		South Molton			
1000	50	*Southampton*			
		Sowerby, Yorksh.			
		Stretford			
		Stokesly			
		Stafford £10,000			
		Staines and Egham			
		Staley Bridge £15,000		10 0 0	
		Stamford £11,250			
		Stockport £34,200		7 11 0	
		Stockton-on-Tees £3600		8 0 0	
840	9½	Stockton, New	9 10 0		8 0 0
960	10	Stoke-upon-Trent	10 0 0	6 10 0	12 0 0
500	10	„ new shares	3 0 0	6 10 0	5 0 0
		Stone, Stafford			
		Stoney Stratford			
		Stourbridge			
		Stowmarket			
150	20	Stratford-on-Avon	20 0 0	7 10 0	30 0 0
		Stroud			
169	10	Swaffham	10 0 0	5 0 0	5 10 0
		Swansea £9000			
		Sudbury			
		Sunderland, old			
6400	5	*Sunderland*, new	5 0 0		
		Swindon			
2800	5	*Taunton*	5 0 0		2 10 0
		Tadcaster			
		Tamworth			
		Tavistock			
		Teignmouth			
		Tenbury			
		Tenby			
		Tenterden £2000		2 10 0	
		Tetbury, Gloster			
		Tewkesbury			
		Thetford			
		Thirsk			
		Thornbury			
		Thorne			
		Tiverton			
670	5	Todmorden	3 0 6		
		Torquay			
		Torrington, Devon			
		Totnes			
		Totnes and Bridgetown Consumers			
		Tottenham		6 0 0	
		Towcester			
		Tring			
		Trowbridge (see British Provin.)			
75	50	Truro	50 0 0	2 0 0	
		Tunbridge			
		Tunbridge Wells			
		Ulverston			
		Uppingham			
		Usk, Monmouth			
		Uttoxeter			
		Uxbridge			
1000	25	*Wakefield*, old capl	25 0 0	6 0 0	24 0 0
1600	5	„ new „	5 0 0	6 0 0	4 16 0
300	10	Wallingford	10 0 0	5 0 0	8 0 0
		Wandsworth			
		Wantage			
		Warrington £18000		10 0 0	
100	10	Wareham	10 0 0	3 10 0	8 0 0
120	25	Warminster	25 0 0	5 0 0	27 0 0
		Warth			
		Warwick £15,000		6 0 0	
		Watford			
		Welchpool, Mutgy.			
		Wellingborough			
		Wellington, Salop			
		Wellington, Smrst.			
		Wells, Smrst. £4000		6 0 0	
		Westbury			
		Weston-sup.-Mare			
2000	5	West Ham	5 0 0	6 0 0	5 0 0
		Whitby			
		Whitehaven			
		Whittlesea			
		Wigan £10,160		5 0 0	
		Willenhall			
		Winchelsea			
		Winslow			
240	10	Wimborne Minster	10 0 0		
		Wincanton			
		Winchester			
900	12½	Windsor	12 10 0	10 0 0	23 0 0
		Witham			
		Witney			
4448	10	*Wolverhampton*	10 0 0	7 10 0	11 10 0
		Woburn			
210	10	Wokingham	10 0 0		10 0 0
		Woodbridge			
		Wooler			
		Wotton-un.-Edge			
		Worcester			
		Workington			
		Worksop and Radford			
		Wirksworth			
		Worthing			
		Wrexham			
		Woolwich			
		Woolwich Consms.			
		Wymondham			
		Yarm			
795	20	Yarmouth	20 0 0		15½ to 16½
		Yeovil			
		York Untd. £55,000			
		SCOTLAND.			
		Aberdeen			
		Airdrie			
		Alloa			
		Anstruther			
		Ardrossan, nr. Saltcoats			
550	20	Arbroath	20 0 0	7 10 0	27 10 0
		Auchterarder			
		Auchtermuchty			
		Ayr, old (see Brit. P.			
		Ditto, new			
		Banff			
		Bathgate			
		Beith			
		Biggar			
300	6	Borrowstowness	6 0 0	5 0 0	8 0 0
		Brechin			
		Broughty Ferry, near Dundee			
		Burntisland			
		Campbelton			
		Clackmannan, near Alloa			
		Coatbridge			
		Coldstream			
		Collinsburgh			
		Crieff			
		Crail, Fife			
		Cumbernauld, near Glasgow			
600	5	Cupar Angus	5 0 0	6 0 0	5 10 0
250	10	Cupar Fife	10 0 0	7 10 0	14 0 0
		Dalkeith			
		Dingwall			
		Dumbarton			
400	20	Dumfries	14 0 0	5 0 0	20 0 0
		Dunbar			
		Dunblane			
		Dundee, old			
		„ new			
860	10	Dunfermline	10 0 0	6 0 0	12 12 0
		Dunkeld			
		Dunse			
		Dysart			
6000	25	*Edinburgh Gas Co.*	25 0 0	10 0 0	45 0 0
		„ *and Leith Co.* £150,000		6 10 0	
		Elie			
		Elgin			
		Falkirk, old			
		„ new			
		Falkland			
		Ferry Port on Craig, Fife			
		Forfar			
		Fort William			
		Fraserburgh			
		Galashiels			
		Girvan			
		Glasgow £122,500		5 0 0	
15000	10	*Glasgow City and Suburban*	9 0 0	7 10 0	9 0 0
		Grangemouth			
		Haddington			
		Hamilton			

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
		Hawick			
		Helensburgh			
		Inverary			
400	1	Inverkeithing	1 0 0	5 0 0	1 0 0
1200	10	*Inverness Gas and Water*	10 0 0	8 0 0	15 0 0
2400	5	„ new shares	1 5 0	8 0 0	2 5 0
		Irvine			
		Jedburgh			
		Keith			
		Kelso			
		Kilmarnock			
		Kincardine			
		Kinghorne			
		Kingskittlo, Fife			
		Kinross			
		Kirkaldy			
320	5	Kirkcudbright	5 0 0	5 0 0	5 0 0
1000	3	Kirkintulloch, near Glasgow	3 0 0	5 0 0	3 0 0
227	5	Kirkwall	5 0 0	5 0 0	4 10 0
518	5	Kirriemuir	5 0 0	6 0 0	
		Lanark			
		Largo, near Leven			
		Largs			
		Lasswade, n. Edin.			
		Lauder			
		Leith			
		Leslie, Fife			
		Lesmahago			
		Leven			
		Linlithgow			
		Linton, n. Nobleh.			
		Lochee, n. Dundee			
		Lochgilphead			
		Lochwinnock, near Paisley			
1200	1	Markinch	1 0 0	7 10 0	1 5 0
		Mauchline			
		Maxwell-town, n. Dumfries			

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
		Melrose			
718	2	Mid & East Calder	2 0 0		2 0 0
192	5	Moffat	5 0 0		
		Montrose			
		Musselburgh			
		Nairn			
		Neilston, n. Glasg.			
		Newburgh, Fife			
		Newton Stewart			
		North Berwick, n. Haddington			
		North Queensferry			
		Oban			
		Peebles			
800	25	Perth	25 0 0	1 4 0	22 10 0
		Peterhead			
		Pittenweem			
		Polloksbaws, near Glasgow			
		Port Glasgow			
		Portobello, near Edinburgh			
		Prestonpans			
		Renfrew, n. Paisley			
		Salteoats			
		Selkirk			
		South Queensferry			
		St. Andrew's			
		Stewarton			
		Stirling			
		Stonehaven			
		Stranraer			
		Strathaven, near Hamilton			
		Thurso			
		Tillicoultry, n. Alloa			
800	1	Tranent	1 0 0		1 0 0
		Troon			
		Wick			
		Wigton			
		Wemyss	4 10 0		

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
		IRELAND.			
300	10	Armagh	10 0 0	8 0 0	14 10 0
700	50	*Belfast*	50 0 0		
		Ballymena			
		Carrick-on-Suir			
		Carrickfergus			
		Cashel			
		Carlow, new			
		Cork (see United General)			
		Coleraine			
		Clonmel (see British Provincial)			
		Drogheda			
19,000	10	*Dublin Consumers*	5 0 0	6 0 0	5 0 0
		Dublin Hibernian (see United Gen.)			
160	25	Dundalk	25 0 0		22 0 0
		Dungannon			
		Downpatrick			
		Enniskillen			
		Galway			
400	10	Kilkenny	10 0 0	8 0 0	11 5 0
		Limerick (see U.G.			
1735	5	Limerick Consum.	5 0 0	5 0 0	5 0 0
600	15	Londonderry	15 0 0	6 13 4	21 10 0
500	6½	Lisburn	6 5 0	5 0 0	6 5 0
520	10	Lurgan	6 0 0	6 0 0	6 0 0
		Monaghan			
		Nenagh			
448	5	Newtownards	5 0 0	4 0 0	5 0 0
		New Ross			
		Newry			
125	20	Portadown	20 0 0	5 0 0	20 0 0
		Sligo			
		Tralee			
		Waterford			
		Wexford			
		Youghal			

The Gas Works in the undermentioned towns belong to private individuals:—

Carlow, old. Deal. Ely. Farsley. Gainsborough. Goole. Hertford. Holt. Huntingdon. Kingston-on-Thames. Lancaster. Lynn. Morpeth. Oswestry. Peterborough St. Alban's. Sandwich. St. Helier's, Jersey. Sheerness. Sidmouth. Sittingbourne. St. Peter's Port, Guernsey. Spalding. Thame. Waltham Abbey. Ware. Wem. Weymouth. Whitchurch (Salop). Wisbeach.

The Gas Works belong to the Corporations, or to Commissioners acting under special acts of Parliament, in the following towns:—

Greenock. Keighly. Knaresborough. Manchester. Milton (Kent). Paisley. Rochdale. Rothesay. Richmond (Yorkshire). Salford. Strabane. Walsall. Wells (Norfolk).

*** We should feel greatly obliged by agents, or others interested, furnishing us with such corrections for our Share List as we may not have received through our usual channels of communication; our object being to present as accurate a list of prices as can be obtained; to procure which, we solicit the aid of correspondents in general.

Price Current.

The following List of Prices is corrected by an eminent wholesale house in each trade up to the latest period:—

CASTINGS, per Ton.

Average Weight of Cast Iron Pipes, per Yard.

1½ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow	Newcastle.	Wales.	Yorkshire, Derbyshire, and Staffordshire
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pig Iron, No. 1	3 7 6	2 10 0	3 0 0	3 15 0	3 10 0
1½ and 2 inches Socket Pipes	6 0 0	5 0 0	5 10 0	5 15 0	5 15 0
2½ and 3 do. do.	5 17 6	4 17 6	5 7 6	5 12 6	5 12 6
4 and 5 do. do.	5 15 0	4 15 0	5 5 0	5 10 0	5 10 0
6 inches and upwards do.	5 12 6	4 15 0	5 2 6	5 7 6	5 7 6
Extra for bends, branches, and connection	2 0 0	2 0 0	2 0 0	2 0 0	2 0 0
Retorts, 1st fusion	5 5 0	..	..	4 17 6	5 0 0
Do. 2nd fusion	5 15 0	4 10 0	4 17 6	5 5 0	5 5 0
Tank Plates, ⅜ thick and above	5 10 0	4 17 6	5 0 0	5 7 6	5 17 6
Do. less than ⅜	5 15 0	5 0 0	5 0 0	..	5 10 0
Plain Castings ex. models	5 15 0	5 0 0	5 0 0	5 10 0	5 10 0

COALS.

NEWCASTLE. Unscreened.	s. d.	
Tyne Main	5 6	per ton.
Ravensworth Pelaw	5 9	„
Dean's Primrose		
Pelton		
Brancepeth	6 0	„
Medomsley		
New Tanfield		
Pelaw	6 3	„
Eighton Moor		
Felling Main		
Hutt's Tanfield		
New Pelton		
Peareth	6 6	„
South Pelaw		
Waldridge		
South Peareth		
South Pontop		
Ramsay's Cannel	12 0	„

DERBYSHIRE. Unscreened.	s. d.	
Clay Cross		
Deep Main		
Jerries		
New Birchwood	6 6	per ton.
New Shipley		
Sleight's		
Soft Main		
SCOTCH CANNEL.		
Kirkness best	23 0	„
Ditto seconds	14 0	„
Lothian	18 0	„
Lesmahago	16 0	„
Wemyss	15 0	„
Dombristle	12 0	„
Lethans		
Bridgeness	11 0	„
Kinneil		
Lochgelly	10 0	„
Lumphumans		

FIRE GOODS.

Best Fire Bricks, 60s. per thousand, at Newcastle.
Do. Clay, 12s. per ton do.

WROUGHT IRON TUBING, subject to 30 per cent. Discount.

	2 inches.	1½ inch.	1¼ inch.	1 inch.	¾ inch.	½ inch.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent welded tubes, from 4 to 12 feet, per foot	1 8	1 0	0 10	0 7	0 5	0 4½
Ditto „ 2 to 4 feet	One penny	per foot	extra.			
Ditto „ 6 in. to 18 in., each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting pieces, or long screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, wrought iron	3 9	2 3	1 9	1 0	0 10	0 8
Springs, wrought iron	3 9	2 3	1 9	1 0	0 10	0 8
Elbows, wrought or cast	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, wrought or cast	4 6	3 0	2 6	2 0	1 6	1 2
Iron cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing sockets	1 3	0 9	0 8	0 6	0 5	0 4
Plain sockets	1 0	0 8	0 7	0 5	0 4	0 3
Caps, plugs, nipples, backnuts	1 3	0 9	0 8	0 6	0 5	0 4
Flanches	1 9	1 6	1 3	1 0	0 9	
Syphons, 2 quart	15 0	14 0	13 6	13 0	12 0	
Ditto 1 quart	11 0	10 0	9 6	9 0	8 6	
Tongs or nippers each pair	9 0	7 0	6 6	5 6	4 9	4 6
Elbow burners per dozen	7 6	jet or batwing.				
Straight burners „	6 0	ditto.				

Stocks, dies, and taps, for 2 inch, 1½ inch, and 1¼ inch tubing ..... £8 10s. 0d. per set.
Ditto, do. and do. „ 1 „ ¾ „ and ½ „ „ ..... 5 5 0 „
Ditto, do. and do. „ ¾ „ 2-8 „ and ⅜ „ „ ..... 3 0 0 „

FREIGHTS, per Ton.

Coastwise—Newcastle.	s. d.
Chatham & Roches.	5 0
Colchest. & Maldon	9 0
Cork	9 0
Dartmouth	8 0
Devonport	7 6
Dover	6 0
Dublin	9 0
Exeter Quay	9 0
Faversham	6 0
Folkestone	6 0
Hastings	7 0
Ipswich	5 6
Jersey	8 6
London	5 9
Lowestoft	5 6
Lynn	6 0
Limerick	9 6
Margate	6 0
Newhaven	6 0
Portsmouth	7 9
Plymouth	7 6
Rye	8 0
Southampton	7 6
Totnes	7 6
Teignmouth	7 6
Weymouth	7 6
Yarmouth	5 3
Foreign.	
Amsterdam	9 0
Antwerp	8 0
Boulogne	7 0
Barcelona	18 0
Bordeaux	10 6
Calais	7 0
Caen	9 0
Cadiz	12 6
Christiania	7 0
Dieppe	7 6
Genoa	21 0
Hamburg	7 6
Havre	8 0
Leghorn	19 0
Lisbon	11 0
Marseilles	14 0
Nantes	12 0
Naples	20 0
Rotterdam	8 0
Rouen	11 0
St. Petersburg	—
Stettin	8 9
Toulon	17 0
Trieste	23 0
Venice	23 0